Digital Nudges as Conversion Enhancers in Profit-Oriented and Non-Profit Oriented Digital Business Models

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Abstract

The growing use of digital technologies between consumers and businesses has led to a shift of transactions from an offline context into the online world. These developments have disrupted entire industries, including music, travel, accommodation, and financial services, and created new value pools. A great extent of the value creation can be attributed to profit-oriented business models, as shown by the growing valuation of large platform operators (e.g., Airbnb and Uber). At the same time, significant value is unlocked in non-profit oriented business models such as in the context of non-commercial online sharing economy platforms or the digital government space.

However, the online space also brought new challenges to digital platform operators, such as greater rivalry resulting from increasing transparency. As the Internet has largely removed the barriers to information access, website visitors have been enabled to shop around and gather plenty of information before committing to a binding transaction. Therefore, converting visitors to actual customers or users remains a critical task, both for profit-oriented and non-profit oriented digital business model operators, as they need to ensure value is truly captured.

Previous research in the Information Systems (IS) space around conversion rate optimization in digital business models has primarily focused on the concept of perceived benefits and associated costs when engaging in a particular transaction. While benefits are often related to the product or service, costs are frequently associated with the lack of trust in the digital platform or website operator due to potential misuse of personal information. In addition to the cost-benefit perspective, website design features have been shown to influence user behavior in both profit-oriented and non-profit oriented digital business models. While the intention of certain design feature elements such as banners or ads is directly visible to users, some design elements are aimed at influencing customer behavior inconspicuously – without the users' notice.

The use of visual user interface elements to subtly influence consumer behavior in digital decision environments by leveraging psychological biases are called digital nudges. The literature on digital nudging shows promising results in driving conversion rates in digital business models. However, the use of digital nudges has been mainly limited to research in profit-oriented digital business models. At the same time, traditional, non-digital nudges have been mainly researched in the non-profit oriented context, especially in the government space, which simultaneously represents the origin of nudging theory.

By assessing digital nudges in both non-profit and profit-oriented digital business models, three studies attempt to close this gap. The first study investigates the effect of prosociality nudges on conversion rates on a fictional non-profit oriented online sharing economy platform. Results show that while prosociality increases conversion likelihood, excessive prosociality may also reduce the transaction likelihood. The second study shows how two separately framed communication arguments – one promotion-focus argument conveying convenience and a prevention-focus argument aiming to reduce privacy concerns – increase online verification conversion rate in a fictional profit-oriented digital carsharing platform if data supports the claims. While the prevention-focus claim is stronger than the promotion-focus claim if data is added, the prevention-focus claim's conversion rate without data is weaker than no claim. The third study is positioned in the non-profit oriented e-government space, leveraging social proof cues and default options as nudges to increase the adoption rate of electronic identification (eID). Both nudges increase eID adoption, but default options are a double-edged sword. They simultaneously fuel privacy concerns towards the government, which attenuates the effect of the default option on eID adoption. These concerns can be mitigated by adding social proof cues.

This thesis contributes to our understanding of how digital nudges may be applied to increase conversion rates within profit-oriented and non-profit oriented digital business models. Specifically, this study demonstrates that digital nudges designed to leverage stability biases and perception biases may be used to increase conversion rates in both profit-oriented and non-profit oriented digital business models. The aforementioned first and third study have contributed to a better understanding of how digital nudges may enhance user conversion in non-profit oriented organizations by leveraging the emotional bias and status quo bias to increase conversion. These studies also provided insights on the combined effect of social proof cues and default options on conversion rates: While default options may be used to increase conversion rates, they are ambidextrous as they increase privacy concerns. However, this can be mitigated by adding social proof cues. The second study contributed to a better understanding of how framing and loss aversion can be leveraged to increase conversion rate in profit-oriented business models. Additionally, this study provided some insights into combining theory on communication arguments with third-party assurance seals as supporting data to enhance the effect of nudges further. From a practical point of view, digital business model operators may leverage these findings to redesign their website by employing digital nudges to drive conversion rates and thus increase profitability.

Zusammenfassung

Der zunehmende Einsatz digitaler Technologien hat dazu geführt, dass immer mehr Transaktionen zwischen Konsumenten und Organisationen von einem Offline-Kontext in die digitale Welt verlagert werden. Diese Entwicklungen haben ganze Branchen wie die Musikindustrie, Reiseanbieter, die Hotellerie sowie Finanzdienstleistungen verändert und neue Geschäftsmöglichkeiten geschaffen. Während ein großer Teil der Wertschöpfung auf gewinnorientierte Geschäftsmodelle zurückzuführen ist, wie auch die zunehmende Bewertung großer Plattformbetreiber zeigt (z. B. Airbnb und Uber), wird auch in nicht gewinnorientierten Geschäftsmodellen ein erheblicher Wert freigesetzt, wie zum Beispiel bei nichtkommerziellen Online-Sharing-Economy-Plattformen oder im Bereich E-Government.

Jedoch hat der Online-Bereich Betreiber digitaler Plattformen auch vor neue Herausforderungen gestellt, wie zum Beispiel aufgrund eines erhöhten Wettbewerbs durch zunehmende Transparenz. Da die Hindernisse für Informationszugänge durch das Internet weitestgehend beseitigt wurden, können Website-Besucher bequem und unverbindlich nach Informationen suchen, bevor sie eine rechtlich bindende Transaktion eingehen. Die Konvertierung von Besuchern in tatsächliche Kunden oder Nutzer ist daher nach wie vor eine wichtige Aufgabe, die sowohl von gewinnorientierten als auch von nicht-gewinnorientierten Betreibern digitaler Geschäftsmodelle beherrscht werden muss, um tatsächliche Wertschöpfung sicherzustellen.

Frühere Forschungen im Bereich Informationssysteme (IS) zur Optimierung der Konvertierungsrate in digitalen Geschäftsmodellen konzentrierten sich weitestgehend auf die wahrgenommenen Vorteile sowie der damit verbundenen Kosten bei der Durchführung einer bestimmten Transaktion. Während die Vorteile häufig mit dem Produkt oder der Dienstleistung in Zusammenhang stehen, werden Kosten häufig mit dem mangelnden Vertrauen in die digitale Plattform oder dem Website-Betreiber assoziiert, welches sich aus einem möglichen Missbrauch persönlicher Informationen ergibt. Neben der Kosten-Nutzen-Perspektive haben Website-Design-Funktionen auch gezeigt, dass sie das Nutzerverhalten sowohl in gewinnorientierten als auch in nicht-gewinnorientierten digitalen Geschäftsmodellen beeinflussen. Während die Absicht bestimmter Design-Feature-Elemente wie Banner oder Anzeigen für Benutzer direkt erkennbar ist zielen einige Design-Elemente darauf ab das Kundenverhalten subtil zu beeinflussen, ohne dass Nutzer dies bemerken.

Die Verwendung visueller Benutzeroberflächenelemente zur subtilen Beeinflussung des Nutzerverhaltens in digitalen Entscheidungsumgebungen durch Nutzung psychologischer Effekte wird als *Digital Nudging* bezeichnet. Digital Nudging zeigt vielversprechende Ergebnisse bei der Steigerung von Konvertierungsraten in digitalen Geschäftsmodellen. Der Einsatz von Digital Nudges beschränkte sich bisher jedoch hauptsächlich auf gewinnorientierte digitale Geschäftsmodellen. Gleichzeitig wurden nicht-digitale Nudges hauptsächlich im nicht-gewinnorientierten Kontext untersucht, insbesondere die Verwendung von Nudges durch internationale Regierungen, da hier auch der Ursprung der Nudging-Theorie liegt.

Um diese Lücke zu schließen, wurden in vorliegender Arbeit drei Studien durchgeführt, indem digitale Nudges sowohl im nicht-gewinnorientierten als auch in gewinnorientierten digitalen Geschäftsmodellen untersucht wurden. Die erste Studie untersucht die Auswirkungen von Prosociality-Nudges auf die Konvertierungsrate einer fiktiven, nicht-gewinnorientierten Online-Sharing-Economy-Plattform. Die Ergebnisse zeigen, dass Prosociality zwar die Wahrscheinlichkeit einer Konvertierung erhöht, übermäßige Prosociality jedoch die Transaktionswahrscheinlichkeit verringern kann. Die zweite Studie zeigt, wie zwei getrennt gestaltete Kommunikationsargumente, einerseits mit Schwerpunkt auf Bequemlichkeit und Effektivität und andererseits auf die Verringerung von Datenschutzbedenken (Prävention), die Konvertierungsrate für die Online-Verifizierung auf einer fiktiven, gewinnorientierten digitalen Carsharing-Plattform erhöhen. Der positive Effekt greift jedoch nur, sofern die Kommunikationsargumente durch Daten gestützt werden. Wenn das Argument mit Daten gestützt wird, ist der Effekt des Präventionsarguments stärker als das Argument zur Bequemlichkeit. Ohne Datengrundlage verringert sich die Konvertierungsrate des Präventionsfokus-Arguments jedoch und liegt unterhalb der Konvertierungsrate ohne eines Kommunikationsargumentes. Die dritte Studie befasst sich mit dem gemeinnützigen E-Government Bereich und nutzt Social Proof und vorausgewählte Default Optionen, um die Akzeptanzrate der elektronischen Identifikation (eID) zu erhöhen. Beide Nudges erhöhen die Akzeptanz von eID. Allerdings sind Default Optionen ein zweischneidiges Schwert, da sie gleichzeitig Bedenken hinsichtlich der Privatsphäre gegenüber der Regierung schüren, wodurch der Effekt der Default Option auf die Einführung von eID verringert wird. Diese Bedenken können durch das Hinzufügen von Social Proof gemildert werden.

Diese Arbeit trägt zu unserem Verständnis bei, wie Digital Nudges angewendet werden können, um die Konvertierungsrate in gewinnorientierten und nicht-gewinnorientierten digitalen Geschäftsmodellen zu erhöhen. Insbesondere zeigt diese Studie, dass Digital Nudges, die den Effekt psychologischer Stabilitäts- und Wahrnehmungsverzerrungen nutzen, verwendet werden

können, um die Konvertierungsrate sowohl in gewinnorientierten als auch in nicht gewinnorientierten digitalen Geschäftsmodellen zu erhöhen. Die erste und dritte Studie trägt zu einem besseren Verständnis bei, wie digitale Akteure die Nutzerkonvertierung in gemeinnützigen Organisationen verbessern können, indem sie Emotional Biases und Status-Quo-Biases nutzen, um die Konvertierungsrate zu steigern. Diese Studien bieten auch Einblicke in die kombinierte Wirkung von Social-Proof-Hinweisen und Default Optionen auf die Konvertierungsrate. Während Default Optionen zur Erhöhung der Konvertierungsrate verwendet werden können, kann es auch zur umgekehrten Wirkung kommen: Default Optionen können Bedenken hinsichtlich der Privatsphäre schüren, was jedoch durch Social Proof Hinweise gemildert werden kann. Die zweite Studie trägt zu einem besseren Verständnis bei, wie Framing und Verlustaversion genutzt werden können, um die Konvertierungsrate in gewinnorientierten Geschäftsmodellen zu erhöhen. Darüber hinaus hat diese Studie einige Erkenntnisse von Kommunikationsargumenten im Zusammenhang mit Sicherheitssiegeln von Drittanbietern geliefert, um die Wirkung des Nudges weiter zu verbessern. Aus praktischer Sicht können Betreiber digitaler Geschäftsmodelle diese Erkenntnisse nutzen, um ihre Website neu zu gestalten, indem sie Digital Nudges einsetzen, um die Konvertierungsrate zu steigern und damit die Rentabilität zu erhöhen.

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1. Introduction

1.1. Motivation and Research Question

Digital platforms are becoming increasingly important, as prominent examples, including Uber, Amazon, and other IT-based business models have shown. Despite recent cutbacks in startup valuations (Techcrunch 2020), market expectations still reflect the potential value creation investors attribute to them. Uber was expected to go public with a market cap higher than GE (CNBC 2019) and Airbnb was valued higher than Hilton, the leading global hotel chain (Vox 2019). User motivation to engage with such digital platforms includes trust in the brand, convenience experienced, more sustainable use of resources, and the maximization of wealth, either by earning additional profits or saving costs. Examples for profit generation can be found in the areas of private car sharing (e.g., Cohen and Kietzmann 2014) or accommodation sharing (Fang et al. 2015), while cost savings can be achieved through either a broader cost allocation to several parties as in the case of ridesharing (Andersson et al. 2013; Cohen and Kietzmann 2014) or the avoidance of asset acquisition and maintenance costs (Matzler et al. 2015; Möhlmann 2015; Trang et al. 2015; Tussyadiah 2015).

The majority of digital business models might be pursuing a profit-oriented approach; however, several non-profit oriented digital business models exist as well. These include digital platforms providing products or services to people through a digital interface such as sharing economy platforms, donation platforms or digital government services.

While non-profit oriented sharing economy platforms offering the possibility to swap, borrow, or trade products and services free of charge are growing in importance, governments too are increasingly incorporating information and communication technologies to drive digitalization of government processes, also known as e-government (Sánchez-Torres and Miles 2017).

E-Government has the potential to help build better relationships between government and the public by making interaction with citizens smoother, more comfortable, and more efficient (McClure 2000). An analysis by McKinsey (2014) suggests that capturing the full potential of government digitization could free up to USD 1 trillion annually in economic value worldwide through improved cost and operational performance. Despite its potential, e-government adoption remains low (Capgemini 2017), with trust (Janssen et al. 2018), security, and privacy concerns (Palanisamy and Mukerji 2011) being critical factors limiting e-government adoption by citizens as they result in increased skepticism and mistrust in e-government initiatives (Belanger and Hiller 2006).

These examples show that the economic potential of such platforms in both profit-oriented and non-profit oriented organizations is immense. However, users' motivation to engage with such platforms differs depending on the purpose of the transaction. As a result, both organizational types must rethink how they design the interaction environment to convert them into actual customers using the service.

One means of changing this decision environment to encourage specific behavior are so-called nudges. Nudging describes the process of "gently [encouraging] (someone) to do something" (OED 2017). Nudges attempt to counter or use specific heuristics by manipulating the decision environment to influence people's behavior.

Research has shown that user behavior can be influenced by nudging in both offline and online environments. Although nudges have proven successful in achieving better and more predictable results, research related to nudging has been mostly conducted in offline contexts (Weimann et al. 2016). In the offline world, multiple nudging examples can be found in the governmental space to encourage citizens to behave in a desired way or convert them into a specific outcome. Examples include nudging to increase organ donation rates (Johnson and Goldstein 2004), encourage slower driving behavior (BBC 2014), or increase retirement plan participation (Madrian and Shea 2001).

However, the increasing use of digital technologies means that people frequently make decisions within digital choice environments. Research has shown that digital nudging can be used to influence user behavior in online contexts. Digital nudging refers to the use of user-interface (UI) design elements, including graphic design, specific content, wording, or small features to guide people's behavior in digital choice environments (Weinmann et al. 2016). For example, digital nudges have proven to enhance website stickiness (Benlian 2015), increase online conversion rates (e.g., Koch and Benlian 2017; Amirpur and Benlian 2015; Roethke et al. 2020), improve consumer referral behavior (Koch and Benlian 2015), or increase crowdfunding revenues (e.g., Thies et al. 2018; Tietz et al. 2016).

These examples show that research in nudging has been mainly conducted either in the offline and non-profit (e.g., government) oriented space or online and profit-oriented environment. As the online and offline world are increasingly converging, researchers have called for more attention towards the potential of digital nudges in influencing consumer decision-making within such online choice environments to convert users into certain outcomes (Weinmann et al. 2016). This study follows the call and aims to close the gap resulting from the lack of digital nudging research in the non-profit space and compares the findings with existing digital nudging literature in the online context. This research aims to increase user conversion rate in

both profit-oriented and non-profit oriented business models by applying digital nudging techniques. This has culminated in the following research question:

RQ: How can digital nudges be leveraged to enhance user conversion in profit-oriented and non-profit oriented digital business models?

Multiple empirical studies were conducted to address this research question. The articles relating to these studies are included in this thesis. The next section discusses the structure of the thesis in more detail.

1.2. Thesis Structure and Synopses

This thesis is divided into six main chapters. Following the research question's introduction and motivation in the first chapter, the second chapter presents the overall research context. The following three chapters present the core of this thesis, each covering one article that has been published in peer-reviewed outlets. These articles shed some light on how digital nudges have been employed in both profit-oriented and non-profit oriented online contexts to increase user conversion rate, contributing to answering the overall research question. These articles have been slightly modified for a more consistent appearance throughout the thesis (see Figure 1). The first article in chapter three shows how prosociality nudges are applied to increase conversion likelihood in the context of non-profit oriented digital sharing economy platforms. Chapter four focuses on employing nudges to convert users into verifying their ID online through communication arguments on profit-oriented online platforms. Lastly, the third study in chapter five examines the effect of adding social proof cues and default options to increase user conversion in the non-profit oriented e-government context. Chapter six concludes the thesis with the main contributions to research and practice as well as the limitations.

Article #	Title	Published in
1	**Prosociality nudges as conversion enhancers on non-profit oriented sharing economy online platforms** Schneider, D. (2017): *"Rewarding Prosociality on Non-Commercial Online Sharing Platforms"*	25th European Conference on Information Systems (ECIS), Guimarães, Portugal. **VHB: B**
2	**Framing nudges as conversion enhancers on profit-oriented online carsharing platforms** Schneider, D., Lins, S., Grupp, T., Benlian, A. and Sunyaev, A. (2017): *"Nudging Users into Online Verification: The Case of Carsharing Platforms"*	38th International Conference on Information Systems (ICIS), Seoul, South Korea. **VHB: A**
3	**Default option nudges as conversion enhancers on non-profit oriented e-government websites** Schneider, D., Klumpe, J., Adam, M. and Benlian, A. (2019): *"Nudging Users into Electronic Identification Adoption: The Case of E-Government Services"*	Electronic Markets, Online First. **VHB: B**

Figure 1. Overview of Articles

Next, each of the three articles is summarized and their main contributions are positioned in the context to answering the overall research question. Two of the three articles were written in collaboration with multiple co-authors. As a result, these articles are written from the first-person plural point of view (i.e., we), thus expressing several authors' opinions.

Article 1:

Rewarding Prosociality on Non-Commercial Online Sharing Platforms

Digitization and new trends in consumption behavior have brought forward new business models within the Sharing Economy (SE). While commercial online sharing platforms such as Uber and Airbnb have already received some attention by researchers, non-commercial online platforms have remained largely unexplored. At the same time, prosocial motives are playing an increasingly central role in participation in the SE, calling for a better understanding of prosocial factors influencing user behavior. Prosocial behavior is defined as a broad range of actions intended to benefit one or more people other than oneself (Batson, 2003). To close the research gap in the space of non-commercial online sharing platforms, the effect of prosociality on the likelihood to make a transaction on non-commercial online sharing platforms has been assessed. The effect of prosociality is tested via the use of donations, which represent a channel through with prosociality may be exerted (Khadjavi, 2016). We introduced two independent

variables, donation behavior of users in previous transactions and donation behavior in current transactions. To achieve this, a controlled online experiment with 338 participants was performed who had to swap products on a non-commercial online sharing platform, whereas the product to be exchanged by the experiment participant was inferior to that of the fictional counterparty. We found a significant increase in transaction likelihood in the presence of prosociality. Users who donated in previous transactions are twice as likely to make a transaction and three times more likely if they donate in current transactions. This implies that other users are willing to incur a cost by engaging in an unfavorable transaction in terms of product features, thereby rewarding other users for their prosocial behavior. Interestingly, the effect of current donation behavior on the likelihood to make a transaction is stronger than for previous donation behavior. This might be explained through a greater degree of indirect reciprocity when donations can be directly unlocked by users in current transactions. However, if donation behavior was high both in previous and in the current transaction, the positive effects crowd each other out, suggesting a potential penalization of excessive prosociality. Users may allege excessive donors of following extrinsic transaction motives (e.g., economic motives) rather than altruistic ones, false claims regarding donation behavior or fraudulent funding of donations. This paper contributes to the scarce Information Systems (IS) literature on non-commercial online sharing platforms by introducing prosociality as central design feature and also provides valuable insights into designing incentive schemes to foster traffic on online sharing platforms.

Article 2:

Nudging Users into Online Verification: The Case of Carsharing Platforms

With the emergence of new technologies, user transactions have become increasingly digital and thus anonymous. On many digital platforms, the identity verification is still conducted offline via third parties requiring users to personally visit partner stores (e.g., national post offices) to have their ID verified on site. This is partly due to technical but also security- and privacy-related reasons, where ID misrepresentation may lead to negative financial consequences (e.g., online banking security, insurance fraud, etc.). While offline ID verification can help reduce those risks, it also represents an interruption of the user interaction process with an online platform. This might culminate in a negative consumer experience due to the additional effort and time required as the interaction is partly taken offline. In order to close this consumer experience gap, several digital platforms have started offering identity

verification processes fully online by opting for ID verification technology such as biometrics with facial recognition software and ID scanning conducted via webcam. However, mitigating potential concerns with regards to privacy or security still remain as profit-oriented platforms might leverage personal data otherwise, as several examples including the Cambridge Analytica scandal have shown. We combine Toulmin's model of argumentation with Regulatory Focus Theory to develop communication arguments to nudge users into online verification on profit-oriented digital platforms. Two argument types consisting of both claim and claim supporting data are employed: a promotion-focus argument conveying convenience and a prevention-focus argument aiming to reduce privacy concerns. Third-party assurance seals were introduced as claim-supporting data for each promotion- and prevention-focus argument.

The hypotheses were tested by means of an experimental set-up in the context of a fictional carsharing platform with 299 participants. We selected a carsharing platform for three main reasons. First, online carsharing platforms have started gaining popularity across the world in the past years, emphasizing its relevance as future research agenda both from a practical as well as academic perspective. Second, ID verification on online carsharing platforms is still conducted mainly offline, despite the recent introduction of optional online verification mechanisms highlighting the opportunity for consumer experience improvement. Finally, with the emergence of new digital business models and as user decisions are being increasingly shifted online, the relevance of online ID verification can be generally expected to increase due to users' demand for security mechanisms when engaging in transactions with other users on the Internet.

In a controlled experiment, we manipulated claim and claim-supporting data to assess the effect of promotion- and prevention-focus framed arguments displayed during a typical identity verification process. We find that both claims significantly increase online verification conversion rate if supported by data. The effect of a prevention-focus claim is stronger than that of a promotion-focus claim. However, if a prevention-focus claim is not supported by data, it actually decreases online verification rate compared to if no claim is shown.

Article 3:

Nudging Users into Electronic Identification Adoption: The Case of E-Government Services

With the ubiquity and prevalence of advanced technologies in society, transactions have become increasingly digital, requiring new user identity verification mechanisms. Electronic identification (eID) enables user identity authorization in online environments. Although eID

plays a central role in government initiatives worldwide to digitalize citizen transactions, eID adoption remains surprisingly low. Studies from leading research organizations confirm that there is still significant room for improvement to drive eID adoption, which is often restricted due to limited functionality, poor user experience, and difficulties coordinating across stakeholders. Further, lack of trust as well as security and privacy concerns have been identified as major barriers to successful e-government adoption.

This suggests that purely emphasizing the benefits of e-government services may not be sufficient to increase e-government adoption. Thus, to increase the use of e-government services, the decision environment in which citizens digitally interact with governments must be designed in ways that not only highlight the benefits, but also mitigate potential privacy concerns of digital government services.

Drawing on digital nudging theory and e-government literature, we examine how eID adoption can be increased by changing the decision environment in which users choose eID in a non-profit environment. In a controlled experiment with 161 participants, we investigate the effect of default options (eID vs. offline ID as default) and popularity signals (presence vs. absence of social proof) on users' eID adoption behavior. We employed a 2 (eID as default option: present vs. absent) x 2 (social proof for eID: absent vs. present) full factorial design with between-subject treatments to test our hypotheses. The treatments were manipulated based on vignettes depicted on a website embedded in an online survey.

Both nudges increase eID adoption, but default options are a double-edged sword as they simultaneously fuel privacy concerns towards the government, attenuating the effect of default option on eID adoption. These concerns can be mitigated by adding social proof cues. However, the effect of default options on eID adoption via privacy concerns becomes insignificant once social proof is added as a moderator, thereby offsetting the negative effect of privacy concerns on eID.

Besides the publications summarized above, the following articles were also published during my time as PhD candidate (these are not part of this dissertation):

Lins, S., Schneider, D., Benlian, A. and Sunyaev, A. (2017): "The Shifts of Fortune Test the Reliability of Friends – The Brittle Nature of Signal Reliability in Cloud Service Markets" In: 38th International Conference on Information Systems (ICIS), Seoul, South Korea. VHB: A

Grupp, T. and Schneider, D. (2017): ”Seamless Updates – How Security and Feature Update Delivery Strategies Affect Continuance Intentions with Digital Applications”
In: 25th European Conference on Information Systems (ECIS), Guimarães, Portugal. VHB: B

The next chapter introduces the overall research context relevant to this thesis.

2. Research Context

2.1. Profit-oriented and non-profit oriented organizations in a digital world

In 2011, Marc Andreessen, general partner of the renowned venture capital firm Andreessen-Horowitz, published an article claiming that "software is eating the world" (a16z 2011). He claimed that software programming tools and Internet-based services make it easy to launch new global software-powered startups in many industries without investing in new infrastructure and training new employees. As a result, many incumbent organizations struggle to sustain their ways of generating value for their customers. The risk of disruption resulting from new rivalry and changing consumer behavior makes it increasingly challenging to create unique competitive advantages in today's fast-paced world. Consequently, many companies are increasingly starting to change their ways of doing business. Digital business models have emerged as a new frame for organizations to create and capture value pools in an increasingly online world.

In academic literature, authors argue that organizations can attain a competitive advantage through their business models (e.g., Casadesus-Masanell and Ricart 2010; Markides and Charitou 2004). According to Teece (2010), a business model represents "how the enterprise creates and delivers value to customers, and then converts payment received to profits". Johnson et al. (2008) state that a business model consists of four interlocking elements that, taken together, create and deliver value. The elements are customer value proposition (CVP), profit formula, essential resources, and key processes. The CVP refers to how a company creates value for its customers by getting a particular job done. The profit formula defines how the company creates value for itself while providing value to the customer. Essential resources describe assets such as the people, technology, products, facilities, equipment, channels, and brand required to deliver the targeted customer's value proposition. Finally, key processes are operational and managerial processes that allow organizations to deliver value so they can successfully repeat and increase in scale.

With customer requirements changing and decision-making being increasingly shifted online, organizations need to innovate and adjust their business model beyond simple business process improvements, which neither change the business model nor the sources of value creation (e.g., Mason and Leek 2008; Riedl et al. 2017). More specifically, the use of digital technologies is changing structures and processes, which will influence not only how work is conducted, and employees are affected (Benlian 2020), but also how value is created for customers (Applegate and Collura 2000). As a result, digital business models have emerged in both the private and public sectors, redefining how value is created and captured. According to Veit et al. (2014), digital business models are characterized by leveraging technological advancements to conduct business and generate revenue other than their offline counterparts.

Especially value capture represents a significant challenge for organizations in digital environments. Winning new customers is often more challenging as competition for user attention tends to be fiercer in online environments than in traditional offline channels (e.g., Porter and Golan 2006; Teece 2010) as entry barriers tend to be lower. Additionally, differentiating a product in a digital marketplace where potential customers can easily make detailed feature and price comparisons tends to be more difficult (Teece and Linden 2017). As a result, value can only be properly captured if it underlies a solid revenue model and if the users are actually converted into using a particular product and service.

While digital transformations have become an imperative for most profit-oriented organizations, non-profit oriented organizations such as governments are still lagging in replacing their cumbersome workflows with streamlined digital processes (e.g., Hess et al. 2016; Matt et al. 2015). Incorporating information and communication technologies to drive digitalization of government processes have been termed e-government (Sánchez-Torres and Miles 2017). Several governments worldwide have implemented e-government solutions to improve efficiency, cost-effectiveness, and transparency between citizens and public agencies and authorities (e.g., Katz and Hilbert 2003; Heeks 2003).

Both citizens and businesses expect government information to be readily available online, easy to find and understand, and at low or no cost (McKinsey 2014). An analysis performed by McKinsey (2014) suggests that capturing the full potential of government digitization could free up to USD1 trillion annually in economic value worldwide, mainly driven by improved cost and operational performance.

While non-profit oriented organizations such as governments may face less competition than profit-oriented organizations, citizen adoption rates of digital government services represent a

crucial challenge to policymakers. The proportion of individuals using the Internet for interacting with public authorities in the EU ranges from more than 80% in Nordic countries to less than 30% in countries such as Bulgaria, Italy or Romania (Eurostat 2018). Lack of trust, security, and privacy concerns have been identified as significant barriers to successful e-government adoption (e.g., Yang and Maxwell 2011; Lips et al. 2011; Fan et al. 2014). Hence, the challenge of steering people in a particular direction or encouraging a specific behavior (e.g., buying or using a particular product or service) is not only related to organizations in the private sector, but it also affects non-profit oriented public organizations such as governments (e.g., using a specific government service). Governments around the world have tried steering citizens towards a specific direction such as safe driving (e.g., road signs or speed bumps), paying taxes on time and saving for retirement (disclosure of finance-related information), or eating healthier food (disclosure of health-related information). Thus, to successfully manage the shift from government activities being traditionally performed offline into an online environment, governments will need to adjust their approaches to converting citizens into using digital e-government services.

Finally, it may also be the case that the primary purpose of non-profit oriented organizations is not to streamline government processes, but rather to contribute to other purposes such as a more sustainable view on resource consumption (e.g., Albinsson and Ysanthi Perera 2012; Dabrowska and Gutkowska 2015), the increased importance of ecological consumption (Hamari et al. 2016) as well as social-altruistic motives (e.g., Albinsson and Yasanthi Perera 2012; Gutt and Herrmann 2015). These engagement motives are often found in digital business models which are part of the Sharing Economy, where users interact with each other to make more efficient use of existing resources, e.g., through borrowing and swapping (e.g., Wessel et al. 2017; Piscicelli et al. 2015; Gullstrand Edbring et al. 2015; Martin and Upham 2015). Thus, the motivation to engage with digital organizations ranges from profit maximization and/or monetary savings to a more ecological consumption of resources or helping others.

While this section has highlighted the challenges profit-oriented and non-profit oriented organizations face, the following section sheds some light on converting users into engaging with such organizations.

2.2. Conversion Rate Drivers in Digital Business Models

This section provides a definition and an overview of major conversion rate drivers in digital business models. The conversion rate reflects the interaction between a website and its consumers' purchase choices and is defined as the percentage of users purchasing a product out of the total unique visitors entering a website (McDowell et al. 2016).

Website conversion rates have historically remained in the range of 2-4% (e.g., Holzwarth et al. 2006; Sohrabi et al. 2012). As a result, websites need to attract a large number of visitors to convert them into customers, thereby driving up customer acquisition costs (e.g., Grewal et al. 2004; Hoffman and Novak 2000; Sohrabi et al. 2012) which in turn directly impacts profitability (Li 2004; Silberstein et al. 2001).

The decision to finally engage into a purchase ultimately depends on the value that consumers receive in return, which is a function of both costs associated with and benefits incurred in a particular transaction. In addition to the value perceived, researchers identified website design to significantly influence visitor-to-customer conversion rates (Benlian 2015; Scholz et al. 2017). In the following part, this study sheds some light on both perceived value drivers and website design elements that have proven to drive conversion rates.

In digital environments, costs may not be related merely to the price of a product or service, but it may be related to other factors as well (e.g., Kim and Gupta 2009; Jahng et al. 2007). Several costs related to consumer decision making in digital environments have been covered by academia. At the most basic level, a consumer must decide if he trusts a particular vendor and the Internet as a place to transact with before an online purchase takes place (McCole et al. 2010). Numerous studies have established that trusting beliefs strongly influence customers' intention to purchase from online vendors (e.g., Gefen and Heart 2006; Jarvenpaa et al. 1999). Lack of trust has been identified as a primary reason for consumers' reluctance to purchase from vendors in an online environment (Gefen and Heart 2006; Grabner-Kräuter and Kaluscha 2003; Jarvenpaa et al. 1999; Lee and Turban 2001), for example, due to the risk of a security breach of their personal information (e.g., Koufaris et al. 2004; Tarafdar and Zhang 2007).

Other factors include perceived risk from uncertainty and adverse consequences of conducting transactions with a vendor (e.g., Hsin Chang and Wen Chen 2008; Tsai et al. 2011; Yoon 2002). At the same time, researchers demonstrated that both website content and its design have proven to influence consumers' willingness to buy (Smith and Sivakumar 2004; Sohrabi et al. 2012; Shobeiri et al. 2015). The goal of web design is to direct the consumer to outcomes the website designer determines (Geirland 1996). The use of website design elements, including the checkout processes and removal of graphics (Tsai 2004) and the elimination of backdoor

elements (Zhou et al. 2004) have positively influenced website conversion rates. Similarly, the inclusion of interactive objects such as banner ads (e.g., Chatterjee 2008), pop-ups (e.g., Moe 2006), and landing pages have proven to increase user interactions.

Research has shown that digital nudging can be applied to overcome conversion or adoption barriers by influencing user behavior in online contexts. The next section will provide an overview of nudging theory in general before diving into the context of digital nudges as conversion enhancers.

2.3. Digital Nudging

The increasing use of digital technologies means that people frequently make decisions in digital choice environments. Humans face choices in their day-to-day activities both at work and home, and the outcome of any choice is often influenced not only by the available options but "what is chosen often depends upon how the choice is presented" (Johnson et al. 2012, p. 488). Thus, while the traditional economic theory suggests that human behavior is rational, the psychological theory of nudging argues that humans may act under bounded rationality due to cognitive limitations (Simon 1955). In this context, nudges represent deliberate design decisions within choice environments, which encourage or discourage the use of heuristics to influence peoples' behavior (Thaler and Sunstein 2003).

The change in these heuristics or choice architecture, which is intended to encourage specific behavior, is considered a nudge. "Nudging" describes the process of "gently [encouraging] (someone) to do something" (OED 2017). Nudges attempt to counter or use specific heuristics by manipulating the decision environment to influence people's behavior.

Research in psychology has demonstrated that people act in limited rational ways (Simon 1955), and various heuristics and biases influence their decision-making (Tversky and Kahneman 1974). While nudges may influence decision making in one way or the other, heuristics can support humans overcome these cognitive limitations by reducing the amount of information to be processed in order to make a particular decision, reducing the mental effort required (Evans 2006; Evans 2008; Tversky and Kahneman 1975).

Although nudges have successfully achieved better and more predictable results, research related to nudging has been mostly conducted in offline contexts (Weimann et al. 2016). However, the increasing use of digital technologies has led people to make decisions within online environments frequently. Digital nudging refers to the use of user-interface (UI) design elements, including graphic design, specific content, wording, or small features to guide

people's behavior in digital choice environments (Weinmann et al. 2016). The choice architecture of online environments may include features, such as website designs, warnings, and defaults (Sunstein 2014). For example, the use of design elements on websites has influenced online buying decisions (Amirpur and Benlian 2015) and increased conversion on digital platforms (Koch and Benlian 2016).

According to Fleischmann et al.'s (2014) literature analysis, IS-related research can be grouped into several root categories for cognitive biases. Cognitive biases lead to objectively non-rational decisions that are suboptimal for the decision-maker or other individuals affected by the decision (Kahneman and Tversky 1979; Thaler and Sunstein 2008; Wilkinson and Klaes 2012). These cognitive biases are defined based on their influence on decision-making processes. According to Amirpur's (2017) research, perception biases and stability biases have been frequently used in academia. This study leverages both perception and stability biases to influence decision behavior. The following part elaborates on these two bias categories.

The psychological tendency to lose objectivity in decision making can be traced back to so-called perception biases. Several biases exist within this bias category. One prominent bias in this category refers to framing, which describes the act of designing a decision frame in a way that the "decision-maker's conception of the acts, outcomes, and contingencies associated with a particular choice" (Kahneman and Tversky 1981, p. 453) is governed through psychological principles. Thus, framing refers to a controlled presentation of a decision problem considering different framing methods regarding one particular decision problem. One example of framing can be found in the context of driving, where the perception of speed is framed through a different presentation of the environment, such as painting jagged or sharp lines on the road.

The reciprocity bias is another essential bias within the perception bias category, describing the impulse to reciprocate actions others have done towards us. Reciprocity is a social norm that involves in-kind exchanges between people – responding to another's action with another equivalent action. It is usually positive (e.g., returning a favor), but it can also be negative (e.g., punishing a negative action) (Fehr and Gächter 2000).

Emotional biases represent another important bias, which are part of the perception bias category. Emotional biases describe how people over-rely on their emotions when forming perceptions (Turel et al. 2011) by illogically minimizing negative aspects and maximizing positive facets of a system. Addicts experience positive emotions during use episodes, which in turn influence their cognition and decision-making processes. Both framing and emotional bias are particularly relevant in the context of the studies conducted for this thesis.

The tendency of being comfortable with the status quo can be traced back to so-called stability biases. Default options represent a frequently used nudge in the academic literature that leverages the stability bias. Default options are defined as a pre-set course of action that takes effect if nothing is specified or changed by the decision-maker (Thaler and Sunstein 2008). Governments have employed defaults to increase pension plan and organ donation participation rates (Madrian and Shea 2001; Johnson and Goldstein 2003) and have also been applied in the context of this thesis.

Similarly, loss aversion nudges are a prominent way of leveraging the fact that humans avoid risk, cost, and loss to a much higher degree than rewards or gain to influence consumer decision-making (Kahneman et al. 1991).

Social biases, building upon the tendency to reach consensus and feel the urge to comply with the expectation to conform. Social proof nudges may be used to leverage the fact that in situations of uncertainty, consumers seek behavioral guidance, and hence the greater the number of people making a decision, the more an individual will perceive this to be a more valuable or correct choice (Cialdini 1993).

The next section sheds some light on existing research on applying nudges in the profit and non-profit context.

2.4. Digital Nudging in Profit-Oriented and Non-Profit Oriented Business Models

The origin of nudging can be traced back to 2008 when governments started setting up behavior economics departments to motivate citizens to take desired actions while maintaining their freedom of choice. This was further populated by the book publication "Improving decisions about health, wealth, and happiness" by Thaler and Sunstein (2008), which sparked interest in the concept of nudging across multiple realms. More than 50 studies with more than 1,200 citations exploring the potential benefits of nudging techniques were found between 2008 and 2014 (Szaszi et al. 2018).

Due to its origin in behavioral economics departments, several examples of nudging can be found in the governmental space. However, with growing popularity, the application of nudges went beyond governmental uses in the private sector. This section will provide an overview of nudge usage in both non-profit oriented (e.g., governments or charitable organizations) and profit-oriented business models. We will start with non-profit oriented business models as the concept of nudging originally emerged in the government contexts and has only been later deployed to a digital and thus broader context, including profit-oriented business models.

2.4.1. Nudging in Non-Profit Oriented Business Models

We define non-profit oriented business models as domains where the choice architect's primary intention is not directly geared towards achieving a financial profit but instead serving a more holistic purpose. Research on nudges has predominantly occurred in the offline world (e.g., Kahneman 2011; Tversky and Kahneman 1975). Not surprisingly, most nudging examples in non-profit oriented environments can be found in the societal context and are categorized by their application areas such as health, financial decision-making, or sustainability. The following part provides an overview of the main application areas, their effects, and the limitations in this field.

Several examples can be found in the space of promoting health, including the use of framing effects to encourage mouthwash use (e.g., Rothman et al. 1999), healthy eating (Cadario and Chandon 2019; Skov et al. 2013; Rozin et al. 2011), dietary behavior (Arno and Thomas 2016), healthy food choices (Wilson et al. 2016) and the use of defaults promoting influenza vaccination (e.g., Chapman et al. 2010; Milkman et al. 2011), or the application of social norms to increase healthy nutrition (Reicks et al. 2012; Wisdom et al. 2010; Downs et al. 2009; Roberto et al. 2010).

In a similar vein, nudges have proven to affect financial decision making. In October 2012, the British government automatically enrolled people into workplace pension schemes by selecting automatic enrollment as a default option, requiring citizens to explicitly opt-out rather than opting in (Morrison 2013). According to the National Audit Office (2015), an increase of 9 million people newly saving or saving more in qualifying workplace pensions was expected until 2018. By adding the line "most people pay their tax on time" in letters to taxpayers as a social proof cue, governments have nudged citizens into paying taxes on time, resulting in USD 300 million being brought forward by taxpayers (Behavioral Insights Team 2016).

Another successful example can be found in the case of organ donation, where nudges have shown to increase organ donation decisions. Johnson and Goldstein (2003) reported an increase of 16.3% in donations when donations were set as default.

With regards to more sustainable use of resources, Baca-Motes et al. (2013) found that when hotel guests made a brief but specific commitment at check-in and received a lapel pin to symbolize their commitment, they were over 25% more likely to hang at least one towel for reuse, increasing the total number of towels hung by over 40%. Ebeling and Lotz (2015) found that the purchase of renewable energy despite higher prices could be increased by applying default options. Also, airline company Virigin Atlantic was able to nudge its pilots into using less fuel by sharing information on fuel efficiency and targets with captains as well as including

charitable donation incentives (Lambert et al. 2016). Gaker et al. (2010) showed that person- and trip-specific information regarding greenhouse gas emissions had significant potential for increasing sustainable behavior.

Furthermore, studies reveal that nudging can increase citizen safety. Resutek (2016) showed that road safety could be increased through real-time feedback on driving. Similarly, light sensors have been used to reduce nightlife crime and disturbance (Ranchordás 2019) successfully. Additionally, Gaker et al. (2010) demonstrated that information on peer compliance with pedestrian laws was found to have a stronger influence on pedestrian safety behavior than information on the law, citation rates, or accident statistics. A comprehensive overview of nudging examples in the government space can be found in Benartzi et al. (2017) in the space of financial security in retirement, education, energy, health, job training, and home affairs. Finally, several non-governmental organizations attempt to encourage people to participate in charitable activities, vote for specific outcomes, or donate funds.

As these findings suggest, nudges have proven to influence user behavior in the non-profit oriented space successfully. However, most of these nudging examples are found in the government space, emphasizing the context of health and underrepresentation of digital application areas (Hummel and Maedche 2019). With this study, we aim to fill the gap of digital nudging in the context of non-profit oriented business models by exploring the effect of digital nudges in both the e-government and non-commercial online sharing space.

2.4.2. Nudging in Profit-Oriented Business Models

We define profit-oriented business models as domains where the choice architect's primary intention is geared towards achieving a financial profit. While nudging studies in the more traditional space were classified along with their application fields, digital nudges in profit-oriented business models are often classified by their influence on the decision-making process. Several examples of nudging in profit-oriented business models can be found in the digital space, such as e-commerce or online platforms, as well as in the offline context with few studies leveraging nudges to increase conversion rates.

Babic et al. (2016) demonstrated that online consumer reviews and ratings of products are widely used and significantly influence consumers' purchase decisions. These findings are also supported by Cheng and Wu (2010), who examined the effect of message framing, which describes a product's attribute in positive or negative terms. The authors found that message framing significantly influences participants' attitudes toward buying the product on the

Internet. Furthermore, Koch and Benlian (2017) assessed the impact of framing by applying the concept of loss aversion to compare conversion rates of two common free trial strategies (free-first vs a premium-first) and found that the premium-first approach significantly increased conversion rate. Framing examples can also be found in the context of online content platforms: For example, Huang et al. (2018) demonstrated that nudging messages with monetary incentive, relational and cognitive capital framings lead to an increase in social sharing behavior of online platform content. However, the concept of framing as a nudge has not only been applied in digital contexts, but also in the offline world. Huber at al. (2019) demonstrated that goal framing on monetary benefits within the interface design of charging stations for battery electric vehicles leads to greater charging flexibility to prevent grid congestions.

Similarly, Benlian et al. (2020) found that framing consumer products by attributing them anthropomorphic elements has shown to elicit greater moral care from consumers and greater trust in non-human technological products. Furthermore, Adam et al. (2020) demonstrated in their study that anthropomorphism significantly increased the likelihood of user compliance with a chatbot's request for service feedback. Framing of products has also proven to affect decision-making for product selection for product-similar articles (Mirsch et al. 2017) and directing users into leaving tips (Carr 2013).

Research has also focused on nudging scarcity to increase conversion. Amirpur and Benlian (2015) showed that a sense of urgency can be created to influence customer conversions by displaying limited room inventory during an online hotel booking. In another study, Koch and Benlian (2015) demonstrated that scarcity cues also affect consumer referral propensity on an online fashion service provider. Nudging scarcity online has also been studied in the context of crowdfunding, where sold-out early birds may help increase funding revenues in reward-based crowdfunding (Wessel et al. 2019). Furthermore, nudging research has shown that the positioning of rewards in a menu of rewards can influence support behavior and how much money project creators collect in crowdfunding platforms (Simons et al. 2017) as well as how limited rewards (Weinmann et al. 2017) and decoys may increase the chances of reaching funding target (Tietz et al. 2016).

Priming has also been identified as an effective nudge on converting users into customers. Dennis et al. (2020) found that numeric priming on an e-commerce website had a small but significant effect on consumers' willingness to pay when the product's value was unclear but had no effect when products displayed a manufacturer's suggested retail price. Similarly, Roethke et al. (2020) demonstrated that social influence tactics and reciprocity positively affect users' registration and onboarding behavior on e-commerce sites.

The middle-option bias has also been frequently used in studies to nudge users into selecting a particular option. For example, studies have shown that people tend to select items which are placed in the middle from otherwise identical options (i.e., ceteris paribus) in various contexts such as product location on supermarket shelves (e.g., Christenfeld 1995; Shaw et al. 2000), which can be attributed to the central choice bias. These findings have also been confirmed in the context of crowdfunding, where Simons et al. (2017) showed that donors can be nudged into choosing the reward presented in the middle.
Finally, social influence cues such as popularity (Yi et al. 2014) and ratings (e.g., Deng et al. 2016; Wang et al. 2018) have demonstrated to influence consumers' shopping goals, concluding that "people use others' product evaluations as a source of information about the product" (Burnkrant and Cousineau 1975, p. 214). Other exemplary studies include Klumpe et al. (2020), who showed that social influences affect users' willingness to disclose information on smartphone applications by increasing trusting beliefs.

As these examples show, most nudges leveraged in profit-oriented business models can be found in the digital context. However, an extensive research gap remains regarding the effect of digital nudges by comparing them across both profit-oriented and non-profit oriented business models in online environments. Typical offline nudges are mainly found in the non-profit space, while digital nudges mainly appear in profit-oriented environments (e.g., e-commerce, crowdfunding). With this study, we aim to bridge this gap.

2.5. Thesis Positioning

While many individual studies with nudging examples exist, Hummel and Maedche (2019) found that most studies are focused on the context of health. Hence, a generalized view on the effect of nudging is not feasible. Simultaneously, the authors find that 32% of nudging studies included in their review were conducted in the digital setting. The remainder took place in a traditional, offline context. This shows that assessing the effect of digital nudges still remains a largely unexplored field. Similarly, Kosters and Van der Heijden (2015) assumed that nudges' effectiveness might depend on the context in which the nudges are employed.

To fill this gap, this study will extend current research by assessing the effect of digital nudges in the context of both profit-oriented and non-profit oriented business models such as the e-government space, non-commercial online sharing economy platforms as well as on

commercial online carsharing platforms. With the Internet advancing and transactions being increasingly shifted online, understanding and influencing user behavior in digital contexts will become more important. As a result, organizations need to redesign their customer or user interaction points to convert them into actually using a particular product or service, independent of whether the primary objective is to earn a profit or provide a service to its citizens. Without actual user conversion, no business model will be able to survive or fulfill its actual purpose. This thesis responds to Weinmann et al. (2016) urge for researchers to extend research in the field of digital nudges to achieve desired outcomes in digital decision environments, both in profit-oriented and non-profit oriented ones. The contributions shed light on digital nudges' potential in actively enhancing conversion outcomes within profit-oriented and non-profit oriented digital business models. More specifically, we will assess the effect of nudges building upon two previously discussed bias categories along with the category definitions of Amirpur (2017), namely perception biases and the stability biases (see Figure 2). The following three chapters represent each of the articles that were published in peer-reviewed journals.

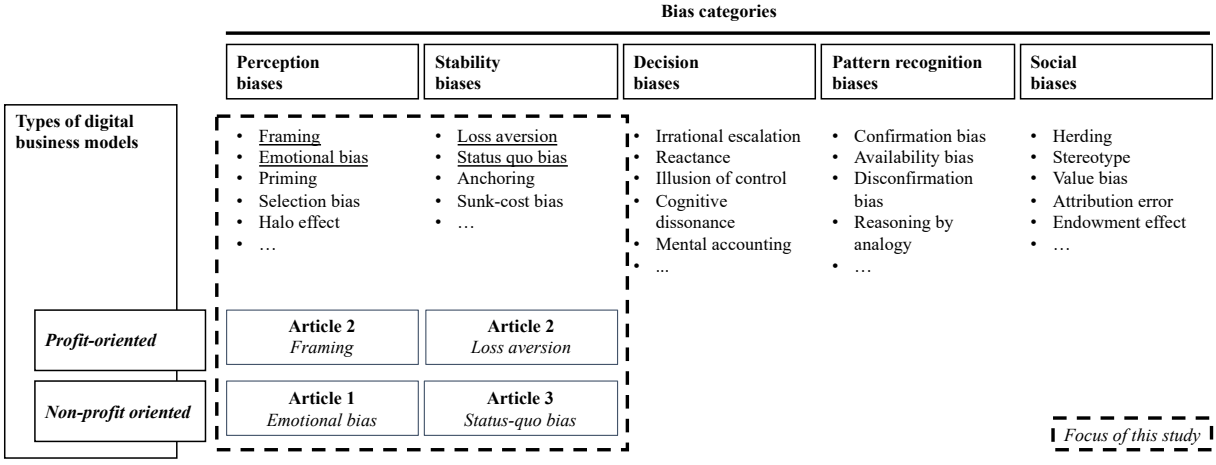

Figure 2. Biases leveraged in research articles to increase conversion rate

3. Rewarding Prosociality on Non-Commercial Online Sharing Platforms

Title
Rewarding Prosociality on Non-Commercial Online Sharing Platforms

Authors
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Abstract
Digitization and new trends in consumption behavior have brought forward new business models within the Sharing Economy (SE). While commercial online sharing platforms such as Uber and Airbnb have already received some attention by researchers, non-commercial online platforms have remained largely unexplored. At the same time, prosocial motives are playing an increasingly central role in participation in the SE, calling for a better understanding of prosocial factors influencing user behavior. This paper aims to close this gap by assessing the effect of prosociality, via donation behavior in previous and current transactions, on the likelihood to make a transaction on non-commercial online sharing platforms. We conduct a controlled online experiment and find a significant increase in transaction likelihood in the presence of prosociality. Users who donated in previous transactions are twice as likely to make a transaction and three times more likely if they donate in current transactions. However, if simultaneously present they crowd each other out, suggesting a potential penalization of excessive prosociality. This paper contributes to the scarce Information Systems (IS) literature on non-commercial online sharing platforms by introducing prosociality as central design feature, and provides valuable insights into designing incentive schemes to foster traffic on online sharing platforms.

Keywords
Sharing Economy, prosociality, non-commercial online sharing platform, donation, design feature

3.1. Introduction

The Sharing Economy (SE) has emerged as a marketplace for alternative consumption models in which peer communities gain access to a pool of shared resources (Botsman and Rogers 2010). Despite the novelty of this technological phenomenon, the economic outlook is impressive with global revenues expected to grow from $15bn in 2015 to $335bn by 2025 (PWC 2015). Uber and Airbnb, two of the most famous players in this space, alone bring together a combined valuation of almost $100bn (Forbes 2016; Bloomberg 2016).

Growth of the SE has been facilitated by recent developments in information and communication technology (ICT) as well as changing consumer preferences regarding consumption of goods and services. Consumption behavior experienced a shift from traditional ownership models (Chen 2009) to temporary access to goods (Bardhi and Eckhardt 2012). These trends have spurred growth of new business models within the SE, which might thus have the potential to become as important as the industrial revolution in terms of how society thinks about ownership (Botsman and Rogers 2010).

Despite those developments, the SE has generally not received much attention from Information Systems (IS) researchers yet (Trang et al. 2015). Within this field, the majority of existing research has focused on user profile design features on commercial online sharing platforms, where products or services are exchanged in return for a monetary compensation. For example, Ert et al. (2016) found that guests on Airbnb infer the host's trustworthiness from the presence of user photos and that the choice to select an offer is affected by this inference. Similarly, Abramova et al. (2015) analysed different response strategies to negative reviews on commercial peer-to-peer accommodation platforms. Results showed that when the subject of complaint is controllable by a host, strategies as confession, apology and denial can improve trusting beliefs towards the host. Thus, while common attributes such as profile pictures and user reviews have been explored, literature on the effect of social aspects on user transaction behavior remains scarce.

However, social aspects have become increasingly relevant in the SE. Participation in sharing activities and the resulting behavioral change in consumption preferences are driven by several factors including a more sustainable view on resource consumption (Albinsson and Ysanthi Perera 2012; Dabrowska and Gutkowska 2015), increased importance of ecological consumption (Hamari et al. 2016) as well as social-altruistic motives (Albinsson and Yasanthi Perera 2012; Gutt and Herrmann 2015). Therefore, the inclusion of prosociality or prosocial behavior defined as broad range of actions intended to benefit one or more people other than oneself (Batson 2003), becomes crucial not only in the assessment of participation motives but

also actual user behavior. This holds particularly for non-commercial online sharing platforms, where social rather than economic participation motives may prevail.

The objective of this paper is to understand whether prosociality is valued in the context of non-commercial online sharing platforms by rewarding more prosocial users with a higher likelihood to successfully complete a transaction. The effect of prosociality is tested via the use of donations, which represent a channel through with prosociality may be exerted (Khadjavi 2016). More specifically, two types of donation behavior are assessed, namely donation behavior in previous transactions and current transactions. Previous donation behavior is defined by users' donation frequency in previous transactions, while current donation behavior postulates whether users donate in a current transaction. We further argue that excessive donation behavior defined as donation behavior in both previous and current transactions, undermines the effect of prosociality by decreasing overall transaction likelihood. Therefore, this study raises the following two research questions:

RQ1: Are users rewarded by a higher transaction likelihood if they engage in prosociality via donations on non-commercial online sharing platforms?

RQ2: Are the effects of previous and current donation behavior on the transaction likelihood on non-commercial online sharing platforms complementary or do they crowd each other out?

From a research perspective, this paper contributes to the scarce IS literature on design features on non-commercial sharing platforms by introducing prosociality as a central component. From a practical perspective, this paper adds to a better understanding of factors influencing user behavior and thereby generating traffic on non-commercial online sharing platforms.

3.2. Theoretical foundation and hypotheses development

This section is structured along the theoretical foundations of our research followed by our hypotheses development. Theoretical foundations are divided into two parts, namely non-commercial online sharing platforms and prosociality.

3.2.1. Non-commercial online sharing platforms in the Sharing Economy

With the rise of international players such as Uber and Airbnb, the SE has increasingly started to receive more attention by researchers. Given the recency of this phenomenon, a precise common definition of the SE is lacking despite the emergence of several SE conceptualizations

such as Access-Based Consumption (e.g., Bardhi and Eckhardt 2012), Collaborative Consumption (e.g., Möhlmann 2015) and Collaborative Economy (e.g. Martin 2016). Since the aim of this study is to shed light on the effect of prosociality on non-commercial online sharing platforms, it will not focus on the clarification of different definitions and terminologies. Instead we revert to the definition of the Oxford dictionary, where the SE describes an economic system in which assets or services are shared between private individuals, either for free or for a fee, typically by means of the Internet (Oxford Dictionary 2016). This definition touches upon two key components, namely compensation received and the sharing activity itself.

Compensation received in sharing activities may differ depending on whether it entails a monetary component or not. Monetary compensation includes for example fees (e.g., Belk 2014b; Lamberton and Rose 2012; Matzler et al. 2015), whereas non-monetary compensation entails for example an exchange of goods such as swapping (Albinsson and Yasanthi Perera 2012). The use of fees is typically found in sharing practices motivated by economic benefits such as cost savings or profit generation. Cost savings can be achieved through either a broader cost allocation to several parties as in the case of ridesharing (Andersson et al. 2013; Cohen and Kietzmann 2014) or the avoidance of asset acquisition and maintenance costs (Matzler et al. 2015; Möhlmann 2015; Trang et al. 2015; Tussyadiah 2015). Examples for profit generation can be found in the areas of private car sharing (e.g., Cohen and Kietzmann 2014) or accommodation sharing (Fang et al. 2015). Similarly, non-monetary motivations are driven by the increasing awareness of a more sustainable use of resources and responsible consumption. These range from government participation in alternative consumption forms (Chasin and Scholta 2015) to smarter use of existing resources through borrowing and swapping (e.g., Piscicelli et al. 2015; Gullstrand Edbring et al. 2015; Martin and Upham 2015). Further examples of compensation can be found in the "true" sharing space, in which no reciprocal exchange occurs but goods and services are rather provided free of charge (e.g., Couchsurfing).

A classification of sharing activities may be conducted along the dimension of ownership, namely whether it is transferred or not. Research exists along both extremes with some authors arguing that solely a transaction without the corresponding transfer of ownership correctly represents the concept of the SE (e.g., Andersson et al. 2013; Bardhi and Eckhardt 2012). Examples where ownership is not transferred include for example private car (e.g., Trang et al. 2015) and accommodation sharing (e.g., Gutt and Herrmann 2015; Tussyadiah 2015). Others include practices in which a transfer of ownership occurs via swapping and trading (e.g., Albinsson and Yasanthi Perera 2012; Barnes and Mattsson 2016) such as swapping of clothes (e.g., Kleiderkreisel) or services (e.g., Craigslist).

This paper focuses on SE platforms or marketplaces operated via the Internet, namely non-commercial online sharing platforms where ownership is transferred via an exchange of goods (e.g., Tauschbörse or Tauschticket). The motivation to focus on this subset of platforms is driven by the importance of social rather than economic benefits in users' participation in the SE, such as altruism (Albinsson and Yasanthi Perera 2012). This is contrary to previous research indicating that the perceived lack of economic benefits (i.e., lack of cost savings) may prevent consumers from participating in collaborative consumption (Buczynski 2013) or that consumers may be concerned about receiving bad quality products and services and that the value from collaborative consumption is not worth the effort (Olson, 2013). We assume that the prevalence of altruistic participation motives marked by feelings of solidarity and bonding (Belk 2010; Benkler 2004; Wittel 2011) is stronger on non-commercial online sharing platforms. Given that the motivation to participate is partly driven by the desire to transact with other users, we use motivation to transact as a proxy for transaction likelihood. Therefore, the transaction likelihood is likely to be higher if prosocial behavior is present on non-commercial compared to more commercial platforms.

3.2.2. Prosociality and indirect reciprocity

Individuals engage in actions intended to benefit others than oneself through helping, comforting, sharing and cooperation. These activities have been coined prosocial behavior or prosociality and may be elicited by altruism (Batson 2003). Given that participation in the SE is partially driven by altruistic motives, a better understanding of the effect of prosociality on user behavior in this context becomes imperative. Motivation to engage in prosociality can be segmented into three broad categories, namely image, intrinsic and extrinsic motivation (Ariely et al. 2009). Image motivation refers to an individual's tendency to be motivated by the other people's perception or image of oneself. Intrinsic motivation is derived from the internal value of doing good, such as the personal interest in the well-being of other people. Finally, extrinsic motivation is based on the notion of material rewards upon giving (e.g., tax breaks). For the purpose of this paper, we will focus on image and intrinsic motivation and exclude extrinsic motivation, given that this paper is positioned in the non-commercial online sharing platform context where no material reward is provided if products or services are exchanged.

Image motivation can best be explained through the theory of indirect reciprocity, where individuals will tend to help those who help others (Alexander 1987). Prominent examples include theories of image scoring (Nowak and Sigmund 1998) and image standing (e.g., Sugden

1986; Leimar and Hammerstein 2001; Panchanathan and Boy 2004) which aim to explain how prosocial actions may lead to reputational benefits. A central notion of these models is that individuals with higher prosocial reputation accrue benefits through indirect reciprocity. Recent theories in the context of indirect reciprocity have focused on conditional cooperation, which implies that people are assumed to be more willing to contribute when others contribute (Fischbacher et al. 2001). Following this theory, contribution rates are likely to be higher when information is provided that many others contribute as well. For instance, Frey and Meier (2004) and Heldt (2005) depicted that if potential donors are provided with information about historical donations made by others, their propensity to donate changed. In the experiment conducted by Frey and Meier (2004), students had the option to donate to two social funds upon payment of their tuition fee. Informing students about historical donation frequency had a significant impact on their propensity to donate relative to a control group. The percentage of students contributing to at least one of the funds increases by more than 2.3 percentage points when they received the information that other students contributed. Heldt (2005) found similar results. In a field experiment he illustrated that the propensity of skiers to contribute towards track maintenance via donations was significantly impacted by information provided about historical donation frequency. The share of subjects giving a contribution was significantly greater in the group receiving information about others' behavior than in the group that does not. Thus, individuals who perceive others to be engaged in prosociality via donations are likely to reward those via the mechanism of indirect reciprocity. At the same time, these individuals become more willing to engage in prosocial behavior themselves, such as via donations. Donations can be classified as a form of charitable giving, which represents one channel through with prosociality might be exerted (Khadjavi 2016).

In the case of intrinsic motivation, indirect reciprocity is less likely to materialize. The widespread phenomenon that people donate money to people who typically do not belong to one's own social group implies that people may follow different motives for charitable giving than observed in indirect reciprocity (Milinksi et al. 2002). The work of Andreoni (1990) has provided key insights into psychological donation motives suggesting that charitable donations can be attributed to a "joy-of-giving" or "warm-glow" effect that results in people gaining satisfaction from knowing that they contributed to a worthy cause. The motivation to engage in prosocial behavior can thus be driven by both indirect reciprocity as well as other motivational reasons such as charitable giving by gaining satisfaction from helping others. While these findings are also relevant for the explanation of prosocial behavior, we will focus only on the concept of indirect reciprocity for the purpose of this experiment as indirect reciprocity and

charitable giving (e.g., donations) represent two channels via which prosociality may be exerted (Khadjavi 2016).

While reciprocal behavior has been confirmed in both laboratory experiments and surveys on fairness support (e.g., Kahneman et al. 1986; Milinski et al. 2002a, b; Rockenbach and Milinski 2006; Engelmann and Fischbacher 2009), it has not yet been explored in more anonymous settings such as in the SE. We argue that indirect reciprocity also works on non-commercial online sharing platforms. Users who engage in prosociality via donations are rewarded by other users and thus more likely to make a transaction compared to users who do not engage in prosociality. However, we differentiate between two types of donation behavior, namely donation behavior in previous and current transactions. The underlying rationale is twofold. On the one hand, more frequent donations in previous transactions might be perceived more credible compared to a single donation in a current transaction. On the other hand, the effect of indirect reciprocity might be stronger when donations occur in current transaction due to a more direct contribution as opposed to in historic donation activities. Therefore, we include previous donation behavior and current donation behavior separately in our research model (Figure 3) and derive our main effect hypotheses:

H1A: Transaction likelihood on non-commercial online sharing platforms increases if a person has engaged in prosociality by donating in previous transactions.

H1B: Transaction likelihood on non-commercial online sharing platforms increases if a person engages in prosociality by donating in current transactions.

In addition to assessing the individual effect of the two prosociality factors, we are also interested in understanding the combined effect on the likelihood to make a transaction. More specifically, we contend that excessive prosociality may also be harmful and thus have a negative effect on overall transaction likelihood compared to if only one of the two factors is present. Previous research showed that offering rewards to increase prosociality may decrease total contribution. This can be explained by the motivation crowding out theory, suggesting that external intervention via monetary incentives may undermine intrinsic motivation to engage in prosocial activities (Frey and Jegen 2001). It may be the case that both previous and current donation behavior are rewarded by a higher transaction likelihood if viewed separate. However, if simultaneously present, users' perceived intrinsic motivation to donate in previous transaction may be reduced in the presence of a donation in current transactions. The combination of both prosociality factors could be interpreted as excessive donation behavior,

potentially suggesting the presence of extrinsic incentives such as leveraging non-commercial online sharing platforms for more self-beneficial reasons. Therefore, additional donations in transactions where previous donation behavior is already high may result in a penalization through a lower transaction likelihood. We thus derive our next hypothesis reflecting this interaction effect:

H2: Current donation behavior will moderate the relationship between previous donation behavior and transaction likelihood such that the effect of high previous donation behavior on transaction likelihood will be lower in the presence compared to the absence of current donation behavior.

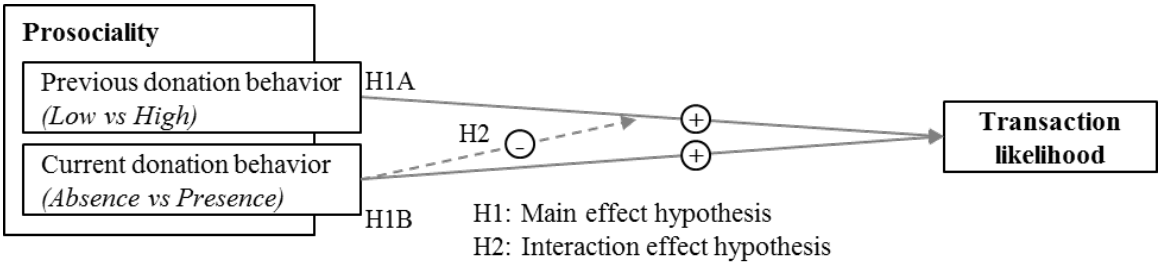

Figure 3. Research model and hypothesis

3.3. Research methodology

This section describes the procedure to testing our hypotheses. We first explain our experimental design followed by a description of the manipulation of our independent variables. Then we define our dependent and control variables as well as our manipulation checks.

3.3.1. Experimental design

To test our hypotheses, an online experiment was conducted because it allowed us to clearly isolate the individual effects of the two prosociality components, previous and current donation behavior, on users' likelihood to transact. In order to frame the experiment in the context of non-commercial online sharing platforms, a transaction on a fictional online sharing platform called "Swapstuff" was created. Participants were asked to make a decision to swap products with a fictional user called Sara. The platform was self-designed and reflected real platform functionalities including a user profile as well as an overview of the features of the products to be swapped. In order to test the effect of prosociality, a 2 (previous donation behavior: high vs low) x 2 (current donation behavior: present vs absent) between-subjects design was employed.

A qualitative pilot test was conducted with several participants to ensure the treatments were manipulated according to the experimental design (Perdue and Summers 1986). Participants were recruited from social networks as well as Amazon Mechanical Turk, an online market place for business services. While participants recruited via Mechanical Turk received a monetary compensation per survey submitted, participants contacted via social networks did not.

The experiment was set up along three steps. In the first step participants received a short introduction to the functionality of typical swapping platforms, including an exemplary transaction. In a second step, the context of the hypothetical transaction was set. Participants were asked to put themselves in the position of a fictional platform user, Alex, who is browsing the platform in need for a toaster. The toaster is offered by Sara, who is the only one offering a toaster so that Alex cannot compare toasters from different users and she is willing to swap in return for a sandwich maker Alex is currently offering on the platform. Participants further received the information that "Swapstuff" was currently supporting a donation program in which a voluntary donation of €3 could be made to the local Red Cross if the parties decided to swap. In the final step participants were navigated to a transaction summary depicting one of the four different transaction outcomes. The summary included both a user profile as well as a product features overview. Based on this information, participants had to decide whether to transact with Sara.

3.3.2. Manipulation of independent variables

Manipulation of the two independent variables, previous and current donation behavior, was conducted on the transaction summary overview presented to the participants of the experiment. The transaction summary showed Sara's user profile, an indication of a current donation as well as a product feature description. The user profile showed Sara's previous donation behavior, mirrored by a donation activity index. The index could be either high, meaning that a donation was made almost every deal, or low meaning that almost no donations had been made. Current donation behavior was illustrated by a sticker at the bottom of the transaction summary page indicating that Sara would donate €3 to the Red Cross upon deal completion. No sticker was shown in the absence of current donation behavior scenario. The manipulation was conducted via a randomization showing only one of the four different combinations. Figure 4 provides an illustration of the manipulation of the two experimental factors. The product and corresponding features were kept constant across all outcomes to rule out potential rival explanation for deal

completion. Furthermore, an incentive was created to not make a transaction by differentiating the number of product features of the products to be swapped. In the experiment, the product features were set equal between the toaster and the sandwich maker, however, while the toaster only had three product features (adjustable thermostat, four-slice capacity and removable crumb tray), the sandwich maker had five (adjustable thermostat, four-slice capacity, removable heat plates, heat control lamps and non-stick heat plates), resulting in an unequal transaction from functionality aspects. Participants were therefore presented with a situation in which they would exchange a product with more features in return for one with less, resulting in a disadvantageous deal from a product feature perspective. The "deal attractiveness hurdle" was introduced as a balance to compensate for the initial incentive to simply transact with Sara for the sake of obtaining the needed toaster. This counterbalance aims to reduce the participants' initial willingness to swap due to the exchange of an "upper-class" product in return for "lower-class" product functionality-wise.

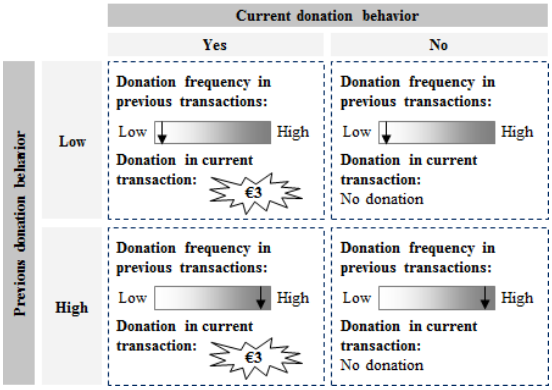

Figure 4. Four experimental conditions (2x2 between-subjects design)

3.3.3. Dependent variables, control variables and manipulation checks

The dependent variable is the proportion of successful deals or transactions in the different subgroups. This proportion acts as a proxy for the likelihood to transact, defined by a point estimator P based on:

$$P\ (likelihood\ to\ transact\ per\ coutcome) = \frac{\sum_{k=1}^{n} x_k}{n}$$

Where n denotes the total amount of participants in the respective outcomes and xk is a binary variable which equals 1 when a participant decided to transact and 0 if not. Furthermore, different control variables were included such as age, gender, attitude towards helping people in need, beliefs in reciprocity as well as measurement of altruistic value orientation. In order to measure participants' attitude towards helping others in need, the helping attitude scale (HAS)

was employed, which is a 20-item measurement method of respondents' beliefs, feelings, and behaviors associated with helping (Nickell 1998) ranked on a 5-point Likert scale. To assess the participant's beliefs in reciprocity, Perugini et al.'s (2003) personal norm of reciprocity (PNS) questionnaire employing a 5-point Likert scale was used. Participants' altruistic value orientation was measured on a 9-point Likert scale along the extended value items list proposed by de Groot and Steg (2007). Finally, we controlled for whether users received a monetary compensation for completing the survey or not via dummy coding. In addition, participants' deal satisfaction, their likelihood to engage in another transaction with Sara in the future as well as their trust beliefs in Sara were captured on a Likert scale ranging from (1)=very low to (5)=very high as separate items. To measure the participant's trust, selected questions from the trusting beliefs questionnaire assessing vendor trust (McKnight et al. 2002) were employed. Finally, a set of manipulation check questions were included in the questionnaire. The checks were used to ensure that participants correctly understood the information provided on the transaction summary, such as Sara's previous and current donation behavior, which participants had to assess on a 5-point Likert scale. Also, the participants' answers on perceived degree of realism and overall understanding of the questions stated and information shown was assessed and rated on a 5-point Likert scale.

3.4. Analysis and results

3.4.1. Sample description, controls and manipulation checks

328 participants were included in the final dataset, thereof 247 were recruited via Amazon Mechanical Turk and 81 from social networks. Out of the 389 participants that completed all questions in a realistic time period, 61 were excluded due to suspicious data patterns indicating monotonous click-through without answer variability. The average age of the respondents is 31 years, ranging from 18 to 66. 265 of 328 participants decided to make a transaction, resulting in an overall proportion of 81% across all four subgroups. Table 1 summarizes the descriptive statistics of the data.

Several one-way ANOVAs were conducted to assess whether the assignment of participants to the different experimental outcomes was random. This was confirmed as no significant difference in gender ($F=.711$, $df=3$, $p>.05$), age ($F=.529$, $df=3$, $p>.05$), helping attitude ($F=.459$, $df=3$, $p>.05$), beliefs in reciprocity ($F=.997$, $df=3$, $p>.05$), altruistic value orientation ($F=.634$, $df=3$, $p>.05$) and survey participation incentive ($F=.378$, $df=3$, $p>.05$) was found between the experimental groups. Thus, participants' demographics and the controls were homogeneous

across conditions, and do not confound the effects of the manipulations. Finally, successful manipulations were confirmed by performing ANOVAs to test for significant differences between the conditions, in which both previous ($F=92.842$, $df=1$, $p<.001$) and current donation behavior ($F=49.363$, $df=1$, $p<.001$) was present. The results indicate that participants rated Sara's previous donation behavior significantly higher in the high donation behavior scenario ($\bar{x}=4.10$, $\sigma=.89$) compared to the low scenario ($\bar{x}=2.85$, $\sigma=1.38$). Similarly, if a donation was made in current transactions, participants rated Sara's current donation behavior significantly higher in the donation presence ($\bar{x}=3.90$, $\sigma=1.17$) compared to the donation absence scenario ($\bar{x}=3.01$, $\sigma=1.13$). As indicators for the external validity of the findings, participants' answers regarding the realism of the scenario were further reviewed. Participants reported high levels ($\bar{x}=4.32$, $\sigma=.64$), therefore it is reasonable to assume that the manipulations worked as intended and the setting was perceived to be realistic.

Construct	Mean	StD	Min	Max
Demographics				
Age	31.2	7.89	18	66
Controls				
Helping attitude	3.95	0.52	2	5
Belief in reciprocity	3.28	0.64	1	5
Altruistic orientation	7.70	1.30	1	9
Dependent variable				
Overall proportion of transactions closed	81%	0.39	0	1
Previous donation behavior low_Current donation behavior absent	59%	0.49	0	1
Previous donation behavior high_Current donation behavior absent	87%	0.34	0	1
Previous donation behavior high_Current donation behavior present	85%	0.36	0	1
Previous donation behavior low_Current donation behavior present	90%	0.30	0	1

Means, standard deviation and range, N = 328

Table 1. Descriptive statistics of demographics, controls and dependent variable

3.4.2. Hypotheses testing

To test the hypotheses, a two stage hierarchical logistic regression was conducted on the dependent variable likelihood to transact (Table 2). While no correlation between the controls and the dependent variable was found, significant correlations among the controls were identified. Therefore, helping attitude, gender and survey participation incentive were excluded and only age, beliefs in reciprocity and altruistic value orientation were included as remaining controls in the model. First, the main effects of prosociality were included, namely previous donation behavior and current donation behavior (Model I), and then the interaction effect (Model II) was added. Both models are highly significant ($p<.001$).

Construct	Model I			Model II		
	Coefficient	S.E.	Odds ratio	Coefficient	S.E.	Odds ratio
Intercept	-0.979	1.264	0.376	-1.302	1.278	0.272
Manipulation						
Previous donation behavior[a] (base case low)	0.786**	0.303	2.194	1.570***	0.403	4.807
Current donation behavior[b] (base case no donation)	1.103***	0.307	3.012	1.943***	0.425	6.983
Previous*Current donation behavior				-2.077***	0.628	0.125
Controls						
Age	0.002	0.020	1.002	0.003	0.020	1.003
Beliefs in reciprocity	0.023	0.235	1.023	-0.010	0.239	0.990
Altruistic value orientation	0.191	0.107	1.210	0.203	0.110	1.225
Log likelihood	*299.576*			*288.380*		
Nagelkerke's R^2	*0.101*			*0.151*		
Omnibus Model χ^2	*21.349***			*32.545***		

* p<.05; ** p<.01; *** p<.001, N = 328; a Previous donation behavior was dummy coded with 0 = Previous donation behavior low and 1 = Previous donation behavior high; b Current donation behavior was dummy coded with 0 = No donation in current transaction and 1 = Donation of €3 in current transaction

Table 2. Binary logistics regression

Model I reveals a significant effect of prosociality on the likelihood to transact as both previous (b=0.786, Wald statistic (1)=6.732, p<.01) and current donation behavior (b=1.103, Wald statistic (1)=12.893, p<.001) are significant. If users' previous donation behavior is high, other users are more than twice as likely to transact with them compared to with users whose previous donation behavior is low in absence of a current donation. The effect on transaction likelihood is even stronger for current donation behavior. Users are three times more likely to transact if a donation is made in the current transaction if previous donation behavior is low. Thus, we can conclude that prosociality has a positive effect on the transaction likelihood through both factors, namely previous (H1A) and current donation behavior (H1B) and that the effect of current donation behavior is stronger.

Model II shows a two-way interaction of previous and current donation behavior. The interaction effect is highly significant (b=-2.077, Wald statistic (1)=10.949, p<.001) indicating that both effects on transaction likelihood are contingent on the presence of each other, even though the effect is weak (odds ratio of .125). More specifically, if both prosociality factors are present, the overall likelihood to transact decreases. Thus, the effect of previous donation behavior on transaction likelihood is weaker in the presence of a donation in current transactions, compared to if no donation was made. In order to further test this relationship, planned contrast comparisons were conducted to examine the effect of current on previous

donation behavior. The results in Figure 5 show that users are more likely to transact if previous donation behavior is high compared to low in the absence of current donation behavior (87% vs 59%, p<.001). However, the transaction likelihood decreases if previous donation behavior is high compared to low in the presence of current donation behavior (85% vs 90%, p>.05), thereby explicating an important moderator for the effect of current donation behavior. This confirms our hypothesis that the effect of previous donation behavior on the likelihood to transact on non-commercial online sharing platforms is weaker in the presence of a current donation (H2).

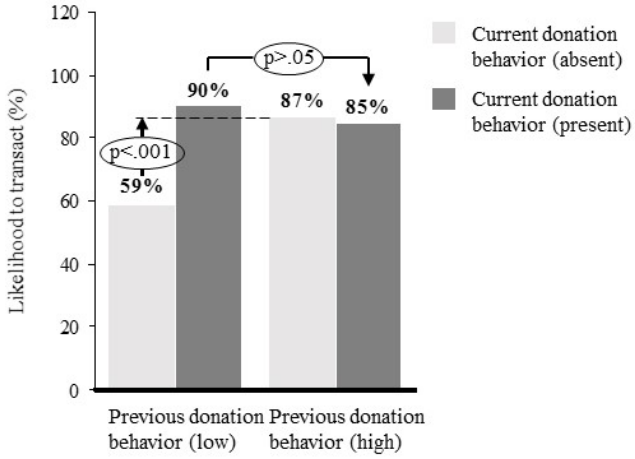

Figure 5. Likelihood to transact for low vs high previous donation behavior in the absence vs. presence of current donation behavior

We are also interested in the effect of prosociality on further transactional aspects, namely deal satisfaction, likelihood to engage in future transactions with the same user as well as perceived trust level. Möhlmann (2015) developed a framework on the determinants of choosing a sharing option again on the commercial online accommodation sharing platform Airbnb. The author found that satisfaction and the likelihood of choosing a sharing option again to be predominantly explained by factors serving users' self-benefit. While this is in line with commercial platform participation motives, we expect that the inclusion of prosociality will yield additional insights in the context of non-commercial online sharing platforms. The effect of prosociality was tested on the three factors by conducting an OLS regression with deal satisfaction (Model I), likelihood to engage in future transactions with the same user (Model II) and finally trust as dependent variables (Model III). Results are depicted in Table 3 and show that prosociality has a significant effect on all three aspects. In Model I (adj. R^2=.079) both previous (b=.356, p<.01) and current donation behavior (b=.261, p<.05) are significant, suggesting that deal satisfaction is on average higher if some form of prosociality is present.

While the coefficient of the interaction effect is negative, it is not significant. This holds for all three models. Model II (adj. R^2=.076) suggests that the likelihood to engage in future transactions with the same user is significantly higher if this user has previously engaged in high donation behavior (b=.290, p<.05), whereas the effect of current donation behavior is insignificant. Finally, Model III (adj. R^2=.120) indicates that both previous (b=.385, p<.001) and current donation behavior (b=.207, p<.05) significantly affect perceived user trust. Altruistic value orientation is significant in all three models and consistent with previous findings that altruism is a motivational factor to participate in the SE. Individuals with altruistic value orientation are likely to value prosociality on non-commercial online sharing platforms to a greater extend compared to individuals without altruistic participation motives. Thus, we can conclude that the presence of prosociality has a positive and significant effect on all three dependent variables, however the effect is mainly driven by previous donation behavior and not donations made in current transactions.

Construct	Model I: Deal satisfaction		Model II: Future transaction likelihood with same user		Model III: Trust	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
Intercept	2.002***	0.415	2.075***	0.404	1.868***	0.330
Manipulation						
Previous donation behavior[a] (base case low)	0.356**	0.134	0.290*	0.131	0.385***	0.107
Current donation behavior[b] (base case no donation)	0.261*	0.131	0.142	0.127	0.207*	0.104
Previous x current donation behavior	-0.312	0.189	-0.176	0.183	-0.242	0.150
Controls						
Age	0.007	0.006	0.008	0.006	0.003	0.005
Beliefs in reciprocity	-0.003	0.074	0.040	0.072	0.081	0.059
Altruistic value orientation	0.181***	0.036	0.173***	0.035	0.163***	0.029
Adjusted R^2	*0.079*		*0.076*		*0.120*	

* p<.05; ** p<.01; *** p<.001, N = 328: a Previous donation behavior was dummy coded with 0 = Previous donation behavior low and 1 = Previous donation behavior high; b Current donation behavior was dummy coded with 0 = No donation in current transaction and 1 = Donation of €3 in current transaction

Table 3. OLS linear regression

3.5. Discussion

The objective of this paper was to shed some light on the effect of prosociality on the transaction likelihood on non-commercial online sharing platforms. In addition to testing the effect of prosociality via previous and current donation behavior individually, the goal was to assess the moderating effect of donations in current transactions on the effect of previous donation

behavior on transaction likelihood. The results confirm that prosociality is rewarded through a greater likelihood to transact on non-commercial online sharing platforms. More specifically, users are more than twice as likely to engage in transactions with users whose previous donation behavior was high compared to low. This implies that other users are willing to incur a cost by engaging in an unfavourable transaction in terms of product features, thereby rewarding other users for their prosocial behavior. Similarly, results also indicate that users are three times more likely to transact if a donation is made by the other user in a current transaction. Users are able to unlock a donation by forgoing proprietary benefits by exchanging a product with superior features into a product with less favourable product features. Interestingly, the effect of current donation behavior on the likelihood to make a transaction is stronger than for previous donation behavior. This might be explained through a greater degree of indirect reciprocity when donations can be directly unlocked by users in current transactions. Despite these differences in effects, the study was able to prove that prosociality, via previous and current donation behavior, is rewarded on non-commercial online sharing platforms. Furthermore, results show that the combined effect of both prosociality factors is weaker compared to if individually present, but still stronger compared to no prosociality at all. Current donation behavior acts as a moderator reducing the effect of previous donation behavior on transaction likelihood. One potential explanation could be that users penalize extreme cases of prosociality due to scepticism of excessive donation behavior resulting from the additional donation in the current transaction. Users may allege excessive donors of following extrinsic transaction motives (e.g., economic motives) rather than altruistic ones, false claims regarding donation behavior or fraudulent funding of donations. Finally, the study highlights some additional benefits of prosociality in addition to higher transaction likelihood on non-commercial online sharing platforms. In the presence of prosociality deal satisfaction increases, users are more likely to transact with the same user in the future and perceive their transaction partner as more trustworthy. Particularly the latter part is consistent with previous research showing that cooperative acts which are truly altruistic can be a costly signal of social preferences and make altruistic individuals more trustworthy interaction partners in social exchanges (Fehrler and Przepiorka 2013). However, these three findings are largely driven by previous donation behavior, which is contrary to our findings on transaction likelihood. One potential explanation could be a greater credibility level of previous donation behavior compared to a single donation in current transactions due to an accumulation of donations over a greater period of time. Prosociality is therefore not only rewarded by others in current transactions, but may also bring future benefits to the person engaged in such behavior.

3.5.1. Implications for research

This study reveals important implications for researchers particularly in the field of non-commercial online sharing platforms, but also in the SE in general. First, it shows that behavioral components such as prosociality qualify as behavioral traits influencing user behavior, amongst several other factors (e.g., trust-enhancing items such as user reviews, the ability to deliver goods, etc.), on non-commercial SE platforms in the IS space. The experiment indicates that if such features are included, other users are much more likely to transact with them. Thus, this study contributes to the understanding of behavioral patterns in the SE, confirming previous research showing that ideological motives such as altruism may influence user behavior and are consequently rewarded on non-commercial online sharing platforms. Second, the results provide a new perspective on the interplay of previous and current donation behavior. Specifically, the findings suggest a non-complementary effect of these two factors on non-commercial online sharing platforms. Donations in current transactions only have the potential to increase the likelihood of transacting only if previous donation behavior is low. This is contrary to the findings of Khadjavi (2016) who found a complementary effect of indirect reciprocity and charitable giving in the context of donations. Tipping at a hairdresser increased significantly if the hairdresser voluntary collected donations to charity or unconditionally engaged in donation activities before customers could. One explanation could be that donation behavior in Khadjavi's (2016) experiment might be distorted by emotional or other personal factors relating to the personal, face-to-face encounter. Given the more anonymous setting of non-commercial online sharing platforms, behavior may follow a much more objective rationale under such conditions with limited user information. Third, the results contribute to existent literature around trust-enhancing features in peer-to-peer marketplaces (e.g., Benlian and Hess 2011). Transactions on non-commercial online sharing platforms are typically characterized by asymmetric information and economic risks. Resnick and Zeckhauser (2002) showed that businesses have developed reputation mechanisms to establish a trust basis among the parties involved. While online reviews of the seller by other users have been identified as the most common mechanism, the findings may provide further insights into additional mechanisms. Introducing behavioral cues such charitable engagement may positively contribute to user perception on such platforms, thereby increasing users' reputation and resulting trust levels.

3.5.2. Implications for practice

From a practical point of view, this study provides valuable insights for both users as well as online sharing platform operators. Users might leverage our findings to increase their likelihood of becoming active transaction partners on non-commercial online sharing platforms. Users may thereby access a broader product portfolio offered by others and create new opportunities to exchange or swap products. This can be achieved by adding prosociality cues on their user profile. However, users should consider the different effects of prosociality features. Adding cues of either previous or current donation behavior to user profiles may increasing the likelihood of being selected as transaction partner. However, if users have engaged in both previous and current donation behavior they should opt only for donations in current transactions as the effect on transaction likelihood is stronger. If both features are used simultaneously the overall transaction likelihood decreases. Users should therefore carefully consider the interplay of different prosociality features when adding such cues to their user profile to avoid penalization of excessive prosociality. The findings also provide useful insights to platform providers. Results show that donations in current transactions have a positive effect on the likelihood of transacting. Platform operators could introduce a scheme that incentivizes transactions by adding a donation function to their platform, thereby benefitting from increased transaction volume. Users would then not merely exchange products but pay a small donation for each successful transaction collected by the platform which could channel this to organizations involved in charity work. Findings also show that both user satisfaction as well as the likelihood to conduct a transaction with the same user increased if prosociality was present. Therefore, platform operators may leverage prosocial cues on user profiles to increase user satisfaction and thus the likelihood to continue using the platform in the future, a critical objective of most online sharing platforms.

3.5.3. Limitations, future research and conclusion

The research findings should be interpreted in light of some noteworthy limitations, which simultaneously might represent future research avenues. First of all, the results were obtained within an experimental setting and therefore do not represent actual transaction behavior. Hence, adaption and perceived realism of the scenario were controlled. It would be interesting to test the effect of prosociality in a field experiment on real non-commercial online sharing platforms (e.g. DieTauschbörse.de, swapstyle.com). The second limitation is the number of moderators included in the model. Only one moderator was included, namely current donation

behavior represented by a donation of €3. Further studies should explore additional factors or a modification of current donation behavior. Additional factors may include a variation of prosociality components such as non-monetary donations (e.g., blood donations, membership in charitable organizations). Modifications of the donation factor in current transactions may entail a differentiation in the source of the donation (e.g. by the user vs the platform) or monetary donation thresholds. Particularly the latter part could provide further insights from which monetary threshold onwards donations are rewarded by other users. Also, platform functionalities used in the current experimental design are limited as several control mechanisms have been omitted. Future research should include additional features as well as trust-building variables such as user reviews to account for additional influencing factors. Another limitation relating to that is that indirect reciprocity could not be explicitly measured in the experiment. Instead, only its concept was applied to the development of the hypotheses. Given that indirect reciprocity represents a critical explaining factor for transaction behavior in the experiment, future research should include this mediator to explicitly test the effect. Finally, the product as well as its features were kept constant in the experiment. In reality products are likely to be in different categories and it would be interesting to assess whether the effect of prosociality on transaction likelihood differs by category. For example, a differentiation between utilitarian or hedonic goods due to different monetary or emotional value perception of goods could be insightful.

Recent developments in ICT and the digitization have brought forward new business models disrupting traditional ways people consume products and services. Despite the rapid growth of commercial online sharing platforms in the SE, the role of non-commercial platforms has received scant research attention so far. This study highlights the importance of prosociality on non-commercial online sharing platforms, where altruistic motives have emerged as a significant driver for user participation. Users who exhibit high donation behavior in previous transactions or donate in current transactions on non-commercial online sharing platforms are more likely to close transactions successfully. However, if previous and current donation behavior are simultaneously present, their joint effect is not complementary. Instead, they crowd each other out, reducing the overall transaction likelihood. Finally, the study showed that prosociality bears significant benefits for the user such as a greater deal satisfaction, higher future transaction likelihood with the same user well as a greater degree of perceived trust level.

4. Nudging Users into Online Verification: The Case of Carsharing Platforms

Title
Nudging Users into Online Verification: The Case of Carsharing Platforms

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Abstract
With the emergence of new technologies, user transactions have become increasingly digital and thus anonymous. As a result, online platforms started offering new user identity verification mechanisms including online verification. However, convincing users to verify online represents a challenge as benefits must be carefully balanced with resulting risks. We combine Toulmin's model of argumentation with Regulatory Focus Theory to develop communication arguments to nudge users into online verification. Two argument types consisting of both claim and claim supporting data are employed: a promotion-focus argument conveying convenience and a prevention-focus argument aiming to reduce privacy concerns. In a controlled experiment, we find that both claims significantly increase online verification conversion rate if supported by data. The effect of a prevention-focus claim is stronger than that of a promotion-focus claim. However, if a prevention-focus claim is not supported by data, it actually decreases online verification rate compared to if no claim is shown.

Keywords
Regulatory Focus Theory, Toulmin's model of argumentation, Human computer interaction, Human behavior in IS, Digital nudging, Online identity verification, Conversion rate

4.1. Introduction

The rise of online players such as Uber and Airbnb highlights the importance of digital platforms as emerging business models. These digital platforms increasingly shift transactions from an offline into an online context. To prevent anonymous and risky online transactions, identity verification processes that ensure reliability of transactions are gaining more and more importance in the context of emerging digital platforms. Identity verification processes refer to mechanisms by which users can verify their personal identity documents (IDs). On several digital platforms, the identity verification is still conducted offline via third parties requiring users to personally visit partner stores (e.g., national post offices) to have their ID verified on site. This is partly due to technical but also security- and privacy-related reasons, where ID misrepresentation may lead to negative financial consequences (e.g., online banking security, insurance fraud, etc.). As a matter of fact, ID fraud has hit a record high in 2016 with 15.4 million victims in the US alone, representing a 16% increase over 2015 (Javelin 2017).

While offline ID verification can help reduce those risks, it also represents an interruption of the user interaction process with an online platform. This might culminate in a negative consumer experience due to the additional effort and time required as the interaction is partly taken offline. In order to close this consumer experience gap, several digital platforms have started offering identity verification processes fully online by opting for ID verification technology such as biometrics with facial recognition software and ID scanning conducted via webcam. Examples can be found mainly in B2C service industries, where companies aim to digitalize several steps of the customer decision journey such as banking, insurance but also carsharing. Online verification represents a significant step towards a better consumer experience through increased convenience resulting from a seamless verification process. Although online verification offers ease and convenience compared to offline verification, it may also pose risks to user privacy and security concerns as personal information in a digital format can be easily misused or leaked. These privacy and security concerns are one of the most frequently cited reasons why consumers do not purchase from Internet vendors (Kim et al. 2016; Lee and Rha 2016; Grabner-Kräuter and Kaluscha 2003).

To mitigate these consumer concerns, organizations employ security and privacy protection mechanisms during online verification processes (Culnan 2000; Laufer and Wolfe 1977). However, digital platforms must carefully balance the effects of protection mechanisms on user experience when designing online verification processes. For example, on the one hand, users may abort the registration process if they feel their data is not secure. On the other hand, they might also refuse to register at all in case the interaction is too cumbersome due to security and

privacy protection mechanisms. Thus, users are likely to face a tradeoff between the greater convenience of a seamless online verification process versus a potentially greater security and privacy risk when faced with the choice of verifying online or offline. This tradeoff between convenience and security and privacy risks raises the question whether users are actually willing to opt for online ID verification. While the benefits of online verification are more obvious for digital platforms players (e.g., lower operating costs, less data-entry errors in the system and faster customer acquisitions), factors influencing digital platform users' decision to opt for online verification are less clear. Thus, digital platforms must carefully design registration and verification processes in order to have users actually opt for online ID verification methods as opposed to relying on the use of traditional offline verification mechanisms.

Research has shown that digital nudging can be used to influence user behavior in online contexts. Digital nudging refers to the use of user-interface (UI) design elements including graphic design, specific content, wording or small features to guide people's behavior in digital choice environments (Weinmann et al. 2016). In particular, communication arguments have proven to influence user behavior when displayed on websites and thus may qualify as digital nudges. Communication arguments refer to claims and their supporting statements used to address certain issues, such as users' privacy concerns (Kim and Benbasat 2006). Previous research assessing the effect of communication arguments on user behavior has been conducted mainly in the context of online purchase decisions. Studies in this area have focused on the effect of assurance claims (e.g., Arcand et al. 2007; Gauzente 2004; Kim et al. 2004) or assurance seals (e.g., Bansal et al. 2015; Hu et al. 2010; Kim et al. 2008) on users' perceived privacy and security and their effect on consumer trust levels towards the Internet retailer. However, according to Toulmin (1958), communication arguments should include both a claim and claim-supporting data to increase credibility of the claim.

Kim and Benbasat (2006) ground their research on Toulmin (1958) and show that communication arguments consisting of both claim and data significantly increase users' trust levels towards the retailer on e-commerce platforms. For example, a claim embedded on a digital platform might be 'You can be assured that your privacy is respected' while the claim-supporting data may read 'Since our privacy practices are held to high standard'. To the best of our knowledge, the study of Kim and Benbasat (2006) as well as the work of Mousavizadeh et al. (2016) represent the only studies assessing the combined effects on claim and data on user behavior in an online environment. Thus, research assessing the interplay and combined effect of claims and claim-supporting data remains scarce. Furthermore, claims have mainly focused on privacy and security aspects, whereas a comparison of the effect of differently framed

claims, such as benefit- versus risk oriented claims, on actual behavior still remains under-researched. Therefore, we aim to close this gap by analyzing the effect of differently framed communication arguments on user behavior.

This study links two streams of research by combining Toulmin's (1958) model of argumentation with elements of motivational decision-making theory. Toulmin's model of argumentation is used as overarching logic to structure our communication argument along both claim and data. The framing of the claim is conducted along motivational principals underlying individuals' decision-making processes put forth by Regulatory Focus Theory (RFT) (Higgins 1998). RFT posits that people's decisions are motivated by two self-regulatory principles, namely promotion- and prevention-focus motivated decisions. Promotion-focused individuals are more concerned with higher level gains such as advancement and accomplishment. Prevention-focused individuals emphasize security and safety trying to avoid risks. Thus, depending on how the arguments are framed, users are likely to react differently to assuring arguments. Therefore, reflecting the previously described tradeoff, we employ both security and convenience-oriented arguments consisting of both claim and data to increase the use of online verification mechanisms on digital platforms. This culminates in the following research question:

RQ: How should digital platforms leverage communication arguments to increase online verification conversion rate?

From a research perspective, this paper contributes to the scarce IS literature on digital nudging by integrating Toulmin's model of argumentation with RFT to assess the combined effect of claim and data in an online decision environment. More specifically, we complement existing research on human behavior in information technology (IT) by combining assurance statements as claims, framed along motivational decision principles, with assurance seals as data to better understand when and why users opt for online verification in the context of digital platforms. From a practitioner's perspective, this paper helps digital platforms to more effectively digitalize customer engagements by increasing the online verification conversion rate.

The paper is structured as follows. First, we introduce the theoretical concepts underlying this study. Then we present our research model and corresponding hypotheses. Next we describe our methodology, followed by the analysis part and results of our experiment. Finally, we discuss implications for research and practice as well as the limitations.

4.2. Theoretical Background and Related Literature

The following section provides an overview of the theoretical foundations underlying this study. We first introduce the concept of nudging in both an offline and online environment by employing communications arguments as nudges to influence user behavior. In the next section, we present Toulmin's model of argumentation as the underlying framework to develop the communication arguments. The communication arguments consist of both an assuring claim as well as claim-supporting data. The framing of the claim has been developed along the two dimensions of RFT, promotion and prevention, while data is represented through third-party assurance seals.

4.2.1. Nudging

The increasing use of digital technologies means that people frequently make decisions within digital choice environments. Humans face choices every day, but the outcome of any choice is influenced not only by rational deliberations of the available options but "what is chosen often depends upon how the choice is presented'' (Johnson et al. 2012, p. 488).

A change in this choice architecture, which is intended to encourage certain behavior, is considered a nudge. "Nudging" describes the process of "gently [encouraging] (someone) to do something" (OED 2017). Nudges attempt either to counter or to use specific heuristics by manipulating the decision environment to influence people's behavior. Whereas traditional economic theory suggests that human behavior is rational, nudging works because people do not always behave rationally. In particular, research in psychology has demonstrated that people act in limited rational ways (Simon 1955) and various heuristics and biases influence their decision-making (Tversky and Kahneman 1974).

Several psychological effects have been identified in the context of nudging. One important example refers to framing, which describes the act of designing a decision frame in a way that the "decision-maker's conception of the acts, outcomes, and contingencies associated with a particular choice" (Kahneman and Tversky 1981, p. 453) is governed through psychological principles. Thus, framing refers to a controlled presentation of a decision problem considering different framing methods regarding one particular decision problem. Decisions can thereby be altered and made more predictable. One example of framing can be found in the context of driving, where the perception of speed is framed through a different presentation of the environment such as painting jagged or sharp lines on roads. These lines frighten drivers enough to have them intuitively slow down, thereby reducing number of accidents by 36% in the six

months after the lines were painted compared to the same six-month period the year before (BBC 2014). Other examples show that governments were able to significantly increase retirement plan participation from 49% to 86% (Madrian and Shea 2001) by making saving for a pension an opt-out rather than opt-in arrangement. Similarly, countries who employed a default opt-in scheme for organ donation experienced significantly higher organ donation rates compared to countries who employed a default opt-out scheme (Johnson and Goldstein 2004). As these examples show, research around nudging has been conducted mainly in offline contexts. In an online environment, the choice architecture might include features such as website design, warnings, communication arguments and defaults (Sunstein 2014). For example, the use of design cues on websites has proven to increase website stickiness (e.g., Benlian 2015), influence online buying decisions (Amirpur and Benlian 2015) and increase consumer referral behavior (Koch and Benlian 2015). Thus, digital nudging refers to the use of UI design elements including graphic design, specific content, wording or small features to guide people's behavior in digital choice environments (Weinmann et al. 2016). Digital nudging is further grounded on human computer interaction theory (HCI), which assesses the impact of information system (IS)-relevant features on user behavior. Prior HCI research has mainly applied concepts from behavioral economics focusing on a few selected heuristics and biases such as the endowment effect, loss aversion (Gunaratne and Nov 2015) or the status quo bias (Goffart et al. 2016). In this study, we develop communication arguments as digital nudges aimed to make online ID verification appear more convenient and secure than offline verification.

4.2.2. Toulmin's Model of Argumentation

According to Toulmin (1958), communication arguments that commonly appear in daily communication consist of three main elements, namely a claim, data and backing. The claim is an assertion or conclusion put forward for general acceptance (Ye and Johnson 1995). Data represents the evidence used to support a claim and backing is the evidence explaining why the data should be accepted (Toulmin 1958; VerLinden 1998). This study focuses only on the first two elements, namely claim and data. We excluded backing under the assumption that the use of third-party assurance seals as data already provides sufficient evidence that data can be accepted due to the independence, expertise and credibility of the third-party issuing the seal. However, future research might include backing as an additional communication argument component.

As the number of products and services offered via the Internet grows rapidly, consumers are more and more concerned about security and privacy issues. According to several studies (e.g. Hua 2009; Belkhamza and Wafa 2009; Hernandez and Mazzon 2007), privacy issues have proven to be important barriers to the use of online services. Several information assurance mechanisms and arguments have gained attention in practice to mitigate consumer concerns during online purchase decisions. In IS research, claims are commonly represented through assurance statements, while assurance seals are used as data to support the statement. Both assurance statements and third-party assurance seals have shown to influence purchase decisions by alleviating privacy, security and product and service concerns (Mousavizadeh et al. 2016).

Assurance statements are vendor-initiated efforts that convey business policies and procedures to warrant a convenient or safe shopping environment. These arguments assure consumers that help will be provided and consumer concerns, issues, and problems will be mitigated or resolved (Mousavizadeh et al. 2016). Arcand et al. (2007) argue that assurance statements represent an important mechanism supporting online consumers. Similarly, Bansal et al. (2008) propose a set of assurance statements as facilitators on consumers' provision of personal information during online transactions which increase consumers' perceived control of the website. However, assurance statements may have different effects on individual consumers depending on how they are framed as well as users' behavioral preferences. In this study, the framing has been motivated by RFT.

RFT describes the strategies that individuals use to regulate their own behavior in goal accomplishment. The theory is based on two separate and independent self-regulatory orientations, namely promotion and prevention. A promotion-focus emphasizes hopes, accomplishments, and advancement needs. Thus, goals are viewed as ideals, and there is a strategic concern with approaching gains. In contrast, prevention-focus emphasizes safety, responsibility, and security needs and there is a strategic concern with approaching non-losses (Higgins 1998). States of promotion- and prevention-focus can also be determined by situational factors. For example, task instructions framed in terms of "gains" versus "non-gains" tend to activate a promotion-focus, whereas task instructions framed in terms of "losses" versus "non-losses" tend to activate a prevention-focus (e.g., Shah and Higgins 1997; Lee and Aaker 2004; Zhou and Pham 2004). The following example illustrates goal accomplishment in the context of a person whose desired goal is to become a college-level tennis player. The person may select strategies that are promotion-oriented such as practicing drills two-hours per day and enrolling in a tennis academy, or strategies that are prevention-focused such as refraining

from smoking and keeping away from junk-food. Promotion-focus individuals concentrate on their ideals, such as wishes or hopes, and aim at achieving those as well as emphasize the presence of positive outcomes when striving for their ideals. Thus, promotion-focus arguments may be employed to emphasize the benefit of online ID verification in achieving the ultimate goal, namely completing the registration and verification process as convenient as possible. Similarly, prevention-focus individuals emphasize the absence of negative outcomes. Hence, prevention-focus arguments have the potential to reduce consumer's privacy concerns in case of online ID verification.

Kim and Benbasat (2006) showed that the effect of arguments is stronger if claim and claim-supported data are combined. While claims may consist of differently framed assuring arguments, claim-supporting data may be represented via assurance seals. Assurance seals are defined as an "assurance of an Internet vendor provided by a third-party certifying body such as a bank, accountant, consumer union, or computer company" (Kim et al. 2008, p. 550). Examples of third-party assurance seals include 'TRUSTe–Certified Privacy', 'Symantec–Norton Secured', and 'McAfee–Secure'. Third-party assurance seals are issued as indications of vendors' compliance with a high standard of technical and/or business practices to decrease online consumers' concerns of online transactions (Zhang 2005). These assurance seals are established means for consumers to assess products and services since they increase consumers' trust (Kim and Kim 2011; Hu et al. 2010; Gefen et al. 2003), enable consumers to gain market insights (Rannenberg 2000), and help make well informed decisions (Aiken and Boush 2006). Similarly, assurance seals have also proven to influence consumer purchasing behavior and assurance perceptions (Sturm et al. 2014). Third-party assurance seals moderate the effect of service performance on repeat purchase intention (Park et al. 2010) and increase consumers' willingness to buy (Zhang 2005). Kim and Benbasat (2006) provide several examples for the three components of an argument put forth by Toulmin (1958) when building trust-assuring arguments in the context of Internet shopping. Claim-supporting data is for example represented by statements such as 'We are a certified member of SecureServer' or 'We are a certified member of ePrivacy'. These statements suggest that security or privacy aspects have been verified by a party other than the website operator. Therefore, third-party assurance seals are added to the assuring statement as claim-supporting data to increase its credibility as well as the argument's overall effectiveness, in this study. Figure 6 illustrates the conceptual framework used to develop the nudge including Toulmin's model of argumentation and RFT.

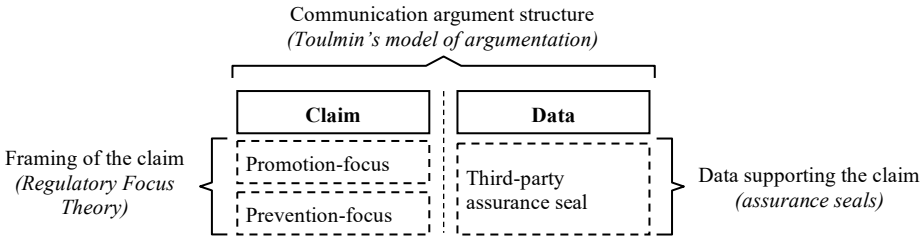

Figure 6. Conceptual Framework of Communication Arguments

4.3. Research Model and Hypotheses Development

Users are required to provide sensitive information such as their personal ID as part of the identity verification during registration process on several digital platforms. When faced with the choice of verifying online or offline, users typically face a tradeoff between the greater convenience of a seamless online verification versus a potentially greater security and privacy risk (e.g., from data theft). Hence, the first objective of this study is to assess whether communication arguments that emphasize convenience as well as security and privacy aspects of online verification can help increase online verification conversion rate. Online verification conversion rate is defined as the proportion of users choosing the online verification mechanism. This is achieved by displaying promotion- and prevention-focus claims and claim-supporting data, while comparing the online verification conversion rate to a scenario where no claim or data is displayed. The second objective is to compare the effects of promotion- and prevention-focus arguments to assess potential differences among the two arguments depending on whether they consist of claim only or claim plus data. Thus, while the first objective requires a comparison of communication arguments to a hanging control group where no arguments are displayed, the second objective demands a direct comparison of the effects of the two prevention- and promotion-focus framed communication arguments. As depicted in Figure 7, our research sheds light on the main effects of promotion- and prevention-focus oriented claims (H1A/H1B) and interactions with claim-supporting data (H2A/H2B) on online verification conversion rate by comparing it to a control group. In a next step, we directly compare the effects of promotion- and prevention-focused claims and corresponding supporting data on online verification conversion rate (H3A, H3B).

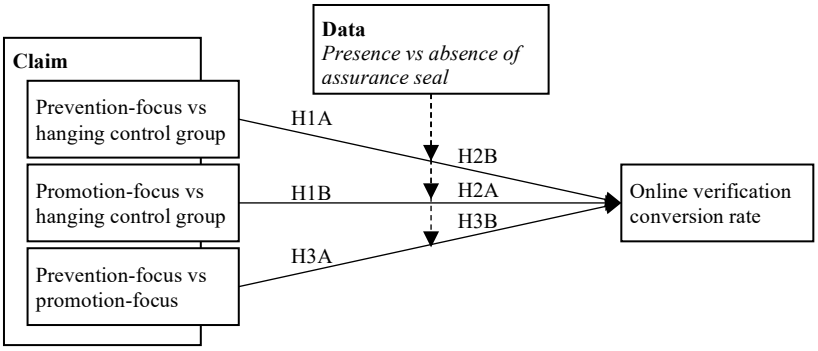

Figure 7. Research Model and Hypotheses

Previous literature around assuring mechanisms has mainly focused on the separate effect of arguments (e.g., Pavlou and Gefen 2004; Pennington et al. 2003; Suh and Han 2003; Malhotra et al. 2004) and third-party seals (e.g., Hu et al. 2010; Kim 2008) conveying perceived privacy and security. However, research assessing the combined effects of arguments and seals on actual behavior remains scarce.

Kim and Benbasat (2006) assessed the effect of multi-level trust-assuring arguments on consumer trust. Following Toulmin's model of argumentation, they found that trust-assuring claims plus claim-supporting data (in written form and not through seals) increase consumers' trusting belief but displaying only a claim does not. Contrary to their findings, we expect that a prevention-focus claim addressing privacy concerns actually reduces online verification conversion rate in the context of user ID verification processes on digital platforms if not supported with data. The reason is that while these concerns may not have been at the top of users' mind before, the statement may raise awareness of potential threats (Nemati and Dyke 2009). Without supporting data or proof of that actual protection mechanism are in place to cope with potential risks, the claim is likely to increase perceived risks and as a result, users will opt for offline rather than online verification. We thus formulate our first hypothesis:

H1A: Displaying a prevention-focus argument that consists of claim only is likely to result in a lower online verification conversion rate than not displaying any argument.

The majority of previously researched arguments have been designed to reduce potential concerns around security, privacy, and product and service quality. However, according to RFT, some individuals are driven by security and safety needs (prevention-focus), while others are driven by growth, advancement and accomplishment needs (promotion-focus). Therefore, depending on the motivational focus of an individual, the framing of a claim may have different effects on user behavior. The main goal of users registering on digital platforms is to use the

service as soon as possible by completing the ID verification in the fastest possible way. We expect that the emphasis of benefits such as fast and convenient ID verification is likely to have a positive influence on the attractiveness of online verification. We thus introduce a promotion-focus claim to test the effect of a more convenience-oriented argument resulting in the following hypotheses:

H1B: Displaying a promotion-focus argument that consists of claim only is likely to result in a higher online verification conversion rate than not displaying any argument.

Claims are perceived stronger by individuals if supported by data (Toulmin 1958). Therefore, we also test for the incremental effect of adding claim-supporting data to the argument. A recent publication by Mousavizadeh et al. (2016) assessed the effect of two assurance mechanisms, assurance statements and third-party certifications, and found that assurance seals supplement the effects of assurance statements on privacy as well as product and service concern. Thus, we hypothesize that claim-supporting data moderates the relationship between the claim and online verification conversion rate such that it will increase the claim's effect on online verification conversion rate. For promotion-focus, we derive the following hypothesis:

H2A: Displaying a promotion-focus argument that consists of claim plus data is likely to result in a higher online verification conversion rate than displaying a promotion-focus argument that consists of claim only.

We hypothesized earlier that a mere privacy-oriented claim is likely to raise privacy concerns in the first place, resulting in a lower online verification conversion rate compared to no claim. However, we expect that claim-supporting data will increase the claim's overall credibility and result in a higher conversion rate compared to a no-claim scenario, reversing the previously mentioned effect. Kim and Benbasat (2006) showed that the effect of trust-assuring arguments comprising both claim and data on consumer trust in Internet stores is stronger compared to both the control group without claim as well as a claim only scenario. In line with their findings, we argue that the prevention-focus claim will be perceived more credible if supported by data. Therefore, the effect of prevention-focus claim plus data will exceed that of the control group and therefore also that of the claim only scenario. This translates into our next hypothesis:

H2B: Displaying a prevention-focus argument that consists of claim plus data is likely to result in a higher online verification conversion rate than displaying a prevention-focus argument that consists of claim only.

In addition to testing the separate effects of promotion- and prevention-focus arguments, we are also interested in directly comparing their effects on online verification conversion rate, both in a claim only and claim plus data scenario. In a claim only scenario, we assume that the effect of promotion-focus claim will be stronger compared to prevention-focus claim. This is mainly because a mere prevention-focus claim aiming to reduce concerns is likely to create awareness of privacy and security threats, increase concerns and thus reduce the online verification conversion rate. This could be compared to a situation in which one would pay at a restaurant with a large banknote and include a comment that the note is not fake without being able to proof the bill's genuineness. We do not expect the same effect for the more positively framed promotion-focus claim highlighting only the benefits as opposed to diminishing risks. This is due to the absence of preexisting worries that online verification might be less convenient than offline verification. However, once claim-supporting data is added, the effect of claim plus data will be stronger for prevention-focus since the critical sources of concern have been eliminated. As promotion-focus is not targeting concerns, we do not expect the same effect of data on online conversion verification rate. We derive our final set of hypotheses:

H3A: Displaying a promotion-focus argument that consists of claim only is likely to result in a higher online verification conversion rate than displaying a prevention-focus argument that consists of claim only.

H3B: Displaying a prevention-focus argument that consists of claim plus data is likely to result in a higher online verification conversion rate than displaying a promotion-focus argument that consists of claim plus data.

4.4. Research Methodology

4.4.1. Experimental Design

This study outlined two objectives. The first is to assess whether promotion- and prevention-focus communication arguments consisting of claim and data can increase online verification conversion rate. The second objective is to directly compare the effects of promotion- and

prevention-focus arguments. In order to test our corresponding hypotheses, we employed a 2x2 between-subjects design with an additional hanging control group. This allows us to conduct both relative and absolute treatment comparisons within a single study and to get a fairly precise look at different treatment combinations. It further allows us to clearly isolate the individual effects of the two components of an argument, namely claim (claim: promotion-focus vs prevention-focus) and supporting data (data: present vs absent) on online verification conversion rate. The hanging control group represents verification decisions made by participants who were not shown any claim or data regarding the convenience or security and privacy aspects of online verification (Fleischmann et al. 2016; Hoffmann and Broekhuizen 2009; Irmak et al. 2005). Following Toulmin's model (1958), an argument consisting only of data without claim is not likely to generate the desired effect, hence we excluded the outcome showing only data but no claim. Figure 8 provides an illustration of the resulting five experimental conditions.

		Data	
		Present	**Absent**
Claim	**Promotion**	Online verification is faster – you can complete your registration in less than 10 minutes! Issued by eCommerce awards	Online verification is faster – you can complete your registration in less than 10 minutes!
	Prevention	Online verification is safe – you can be assured that your data is treated confidentially! Issued by TRUSTe CERTIFIED PRIVACY	Online verification is safe – you can be assured that your data is treated confidentially!
	No claim		*Hanging control group*

Figure 8. Five Experimental Conditions (2x2 between-subjects design plus hanging control group)

The hypotheses were tested by means of an experimental set-up in the context of a fictional carsharing platform. We selected a carsharing platform for three main reasons. First, online carsharing platforms have started gaining popularity across the world in the past years, emphasizing its relevance as future research agenda both from a practical as well as academic perspective. Second, ID verification on online carsharing platforms is still conducted mainly offline, despite the recent introduction of optional online verification mechanisms highlighting the opportunity for consumer experience improvement. For example, DriveNow, a leading carsharing player in Germany, historically required offline personal verification, but recently launched a pilot to test online ID verification. It is now the first provider of free-floating carsharing in Germany offering a registration and verification process that is fully integrated online.

Finally, with the emergence of new digital business models and as user decisions are being increasingly shifted online, the relevance of online ID verification can be generally expected to increase due to users' demand for security mechanisms when engaging in transactions with other users on the Internet.

In the experiment, participants were asked to make a decision to verify their ID online or offline on a fictional online carsharing platform called 'Easycar'. The platform was a self-designed mock-up and reflected real platform functionalities including a description of the two ID verification options, online and offline. A qualitative test was conducted with several participants to ensure the treatments were manipulated according to the five experimental conditions (Perdue and Summers 1986). Following the qualitative test, a quantitative pilot with 220 participants assigned randomly to the various conditions was conducted before the actual experiment. This allowed for changes and adjustments in the design of the experiment. In the final experiment, participants from the US were recruited from Amazon Mechanical Turk, an online market place for business services, who received a monetary compensation per survey submitted. It has been demonstrated that survey results from Mechanical Turk respondents have high reliability and provide higher-quality data than student or online convenience samples (Behrend et al. 2011; Buhrmester et al. 2011; Steelman et al. 2014). In addition, Mechanical Turk is a suitable platform to reach Internet-savvy users, who represent an adequate fit with our survey setting because they are potential users of carsharing platforms. We restricted participation to users with a high reputation (at least 99% approval rate and at least 5,000 conducted tasks), which is a sufficient measure to ensure high data quality (Peer et al. 2014).

The experiment was conducted in three steps. In the first step, participants received a short introduction to the functionality of carsharing platforms and the context of a hypothetical registration process on Easycar was explained. Participants were asked to put themselves in the position of a prospective carsharing user, who is registering on the platform to start using the carsharing service. Participants were informed that the first part of the registration process was already completed and they now only had to verify their ID. In the second step, a short description of the two ID verification options was provided. For online verification, users would have to start a webcam session with a verification agent and present their ID into the webcam to have it verified. For offline verification, users would have to physically visit one of several near-by verification stations in their city (e.g., post office) and present their ID to have it verified in person. These verification processes mirror current practices of a carsharing platform operator and can therefore be considered truly realistic. In the final step, participants were randomly assigned to one of the five experimental conditions in which participants had to

decide whether to verify their ID online or offline. Finally, the experiment was integrated in a broader questionnaire which was used to collect data for the variables included in the research model. Controls and other variables likely to influence users' decision behavior in the experiment were surveyed prior to the experiment (i.e., privacy concerns and personal innovativeness), while questions about demographics (e.g., age, gender, education) were included in the questionnaire following the actual experiment.

4.4.2. Manipulation of Independent Variables

Manipulation of the two independent variables, claim type and claim-supporting data, was conducted on the online vs offline verification user decision page, which followed directly after the description of the two verification options. Participants were shown either a promotion- or prevention-focus claim with either a third-party verification seal as claim-supporting data or no seal. The promotion-focus claim stated 'Online verification is faster – you can complete your registration in less than 10 minutes!'. The prevention-focus claim showed a statement saying 'Online verification is safe – you can be assured that your data is treated confidentially!'. In the two conditions where data was present, an actual third-party assurance seal was included below the statement. The promotion-focus case included an 'e-commerce Awards 2016' seal, which is awarded to the best and most innovative online companies. In the qualitative pre-test, six different third-party seals were shown to 20 participants who had to select the one conveying the greatest convenience or user experience feeling on websites. The e-commerce Awards 2016 was by far the most frequent selected seal. In prevention-focus a 'TRUSTe–Certified Privacy' seal was shown, which qualified as most-trusted security and privacy conveying seal following the pre-test. We therefore conclude that selected seals are consistent with selected claims.

4.4.3. Dependent Variables, Control Variables and Manipulation Checks

The dependent variable is binary (online = 1; offline = 0) and is used to calculate the online conversion verification rate for the different conditions, defined by a point estimator P based on:

$$P\ (online\ verification\ conversion\ rate) = \frac{\sum_{k=1}^{n} x_k}{n}$$

where n denotes the total number of participants in the respective conditions and xk is a binary variable which equals 1 when a participant decided to verify online and 0 if offline. Furthermore, different control variables were included such as sociodemographic (age, gender

and education), personal innovativeness and privacy concern. We used Agarwal and Prasad's (1998) construct for personal innovativeness in the domain of IT to determine users' degree of personal innovativeness. The global information privacy concern construct (Malhotra et al. 2004; Smith et al. 1996) was employed to measure users' privacy concern. All items were measured on a 7-point Likert scale. Finally, a set of manipulation check questions were included in the questionnaire. These checks ensure that participants correctly understood the information provided, such as whether they noticed the claim and the third-party seal. Also, the participants' answers on perceived degree of realism and overall understanding of the questions stated and information shown was assessed.

4.5. Analysis and Results

4.5.1. Sample Description, Controls and Manipulation Checks

Out of the 361 participants that completed the survey, 62 were excluded due to suspicious data pattern such as no variation in responses given (35), insufficient time spent (21) and if the experimental design was perceived as unrealistic (6). Thus, 299 participants were included in the final dataset. The average age of the respondents was 39 years, thereof 46% were female, 45% had a bachelor's degree, 28% some college or no degree and 12% were high-school graduates. In total, 139 of 299 participants decided to verify their ID online, resulting in an overall online verification conversion rate of 46% across all five subgroups including the control group. A summary of selected descriptive statistics is provided in Table 4. Several one-way ANOVAs were conducted to assess whether the assignment of participants to the different experimental conditions was random. For the items gender ($F=.887$, $df=4$, $p>.05$), education ($F=.187$, $df=4$, $p>.05$), personal innovativeness ($F=.476$, $df=4$, $p>.05$) and privacy concern ($F=1.315$, $df=4$, $p>.05$) no significant difference was found between the experimental groups. We can therefore conclude that these individual characteristics are randomly distributed among conditions. Although assignment to the different conditions was randomized, age ($F=3.584$, $df=4$, $p<.01$) was found to be significantly different across the conditions. Nevertheless, we included age in our analysis by controlling for it in the regression without significantly affecting our results.

Construct	Mean	StD	Min	Max	N	Average age
Selected controls						
Privacy concern	4.8	1.18	2	7	299	
Personal innovativeness	4.5	1.36	1	7	299	
Dependent variable						
Online verification conversion rate	46%	0.50	0	1	299	38.7
Control group	41%	0.50	0	1	59	38.8
Prevention_Data	69%	0.46	0	1	59	34.8
Prevention	23%	0.43	0	1	64	41.6
Promotion_Data	59%	0.50	0	1	54	36.6
Promotion	43%	0.50	0	1	63	41.0

Table 4. Descriptive statistics

Finally, successful manipulations were confirmed by conducting ANOVAs and pairwise Welch's t-tests (Welch 1947) for claim and data to assess and compare the proportion of participants who identified the claim and third-party assurance seal across treatments (Table 5). Results show that in the conditions were a claim was present, the recognition rate was between 66% and 79% (compared to 32% in the control group without a claim). Similarly, when data was present the recognition rate equals 56% (promotion-focus) and 90% (prevention-focus), which is higher than in cases without data well below 40%. As indicators for the external validity of the findings, participants' responses regarding the realism of the scenario were further reviewed on a 7-point Likert scale. Participants reported high levels ($\bar{x}$=5.66, σ=1.35). We can confirm reliability of our results since the manipulations were successful and the setting was perceived to be realistic.

	Recognition rate (%)	
Condition	Claim[a]	Data[b]
Control group	32%	36%
Prevention_Data	68%	90%
Prevention	66%	33%
Promotion_Data	69%	56%
Promotion	79%	16%
[a] ANOVA result: F=9.02, df=4, p < .01 [b] ANOVA result: F=25.87, df=4, p < .01		

Table 5. Manipulation checks

4.5.2. Hypotheses Testing

Planned contrast analyses were performed to test the effect of promotion- and prevention-focus arguments by comparing online verification conversion rate among all five conditions including the control group. Logit regressions were performed to compare the effects of promotion- and prevention-focus claim on online verification in the presence and absence of data. The control group was excluded in the latter analysis as the effects of prevention- and promotion-focus arguments were compared against each other.

Table 6 shows the results of the planned contrast analyses for the five conditions including the control group. Online verification conversion rate is highest in the presence of claim-supporting data and the conversion rate of prevention-focus claim exceeds that of the prevention-focus claim. However, in absence of claim-supporting data, results show a greater degree of variation. If presented only with a prevention-focus claim, online verification conversion rate is significantly reduced compared to the control group (23% vs. 41%, $p<.05$), thereby supporting H1A. Users are only slightly more likely to select online over offline verification if presented with a promotion-focus claim in absence of data compared to the control group (43% vs. 41%, $p>.05$). However, we do not find support for H1B as the difference is not significant. Once data is added, promotion-focus online verification conversion rate increases to a level significantly higher compared to the claim only scenario (59% vs. 43%, $p<.05$), confirming H2A. We can also confirm H2B as the same effect is observed for prevention-focus as online verification conversion rate increases and outperforms the prevention-focus claim only scenario (69% vs. 23%, $p<.01$) once data is added. Furthermore, data does not only increase the online verification conversion rate compared to claim only but the claim-data combination also outperforms the control group. This is particularly noteworthy for prevention-focus where online verification conversion rate is lower than in the control group in the claim only scenario but outperforms the control group in the presence of data. We can therefore conclude that adding data to either claim significantly increases online verification conversion rate compared to both claim only as well as the control group. However, while promotion-focus claim in absence of data slightly increases online verification conversion rate, displaying only a prevention-focus claim creates the opposite effect, namely reducing the online verification conversion rate compared to control group.

Online verification conversion rate					
Condition	Mean (SD)	Mean difference (value of contrast)			
		2	3	4	5
Control group	0.407 (0.495)	-0.288***	0.172*	-0.186**	-0.022
Prevention_Data	0.695 (0.464)		0.461***	0.102	0.266***
Prevention	0.234 (0.427)			-0.358***	-0.194**
Promotion_Data	0.593 (0.496)				0.164*
Promotion	0.429 (0.499)				
Significance: * p < .05; ** p < .02; *** p < .01					

Table 6. Planned Contrast Analysis

In the previous step, we assessed the separate effects of our independent variables by comparing online verification conversion rate between prevention- and promotion-focus arguments and the control group. Figure 9 shows the results if we directly compare the effects of the two communication arguments excluding the control group. Three results are particularly noteworthy. First, the effects of promotion- and prevention-focus arguments are very similar in the presence of data. Second, the presence of claim-supporting data increases the online verification conversion rate for both arguments. Finally, the effect of claim-supporting data is much stronger for the prevention- compared to promotion-focus argument.

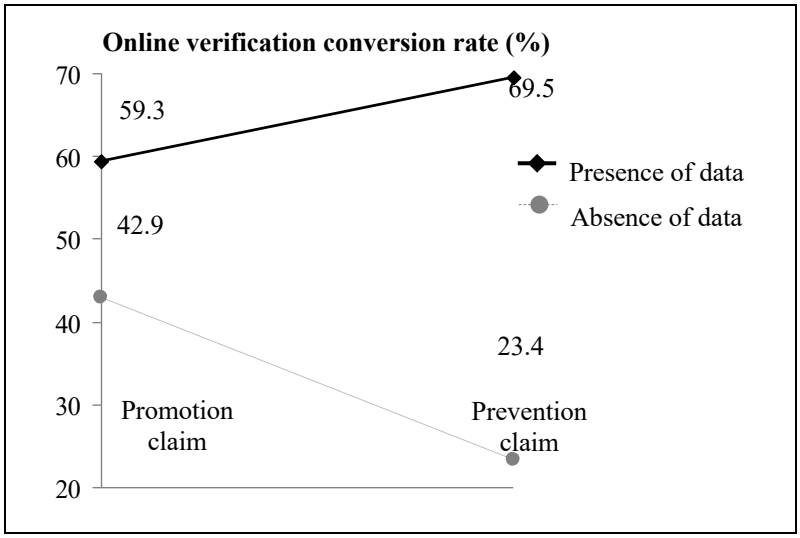

Figure 9. Comparison of Communication Arguments

Table 7 shows our logit regressions. We first included the two main effects, claim and data (Model I) and subsequently added the interaction effect (Model II). Both models are highly significant (p<.001). Model I does not reveal a significant difference in conversion rate between promotion- and prevention-focus claim in absence of data (b=.322, Wald statistic (1)=1.175 p>.05). Therefore, we must reject H3A. However, results show a significant effect of data on

online verification conversion rate (b=1.279, Wald statistic (1)=18.268, p<.01). Thus, while a promotion-focus claim is not likely to result in a significantly higher online verification conversion rate than a prevention-focus claim, the odds of online verification are 3.6 times larger for communication arguments with claim-supporting data than the odds for communication arguments without claim-supporting data. Privacy concern and personal innovativeness are the only significant covariates. The odds of online verification are almost twice as high for users with lower than the odds of users with higher privacy concerns (b=-.571, Wald statistic (1)=17.510, p<.01). Similarly, the odds of online verification are higher for users characterized by greater personal innovativeness than the odds of users with lower personal innovativeness (b=.274, Wald statistic (1)=5.380, p<.02).

	Model I			**Model II**		
	Coefficient	S.E.	Odds ratio	Coefficient	S.E.	Odds ratio
Intercept	-0.144	1.103	0.866	-0.555	1.146	0.574
Manipulation						
Claim[a]	0.322	0.297	1.380	1.079**	0.427	2.942
Data[b]	1.279***	0.299	3.591	2.065***	0.444	7.885
Claim x data				-1.533**	0.601	0.216
Controls						
Age	-0.004	0.013	0.996	-0.003	0.014	0.997
Gender	0.215	0.301	1.239	0.188	0.306	1.207
Education	0.152	0.131	1.164	0.166	0.134	1.181
Privacy concern	-0.571***	0.136	0.565	-0.594***	0.140	0.552
Personal innovativeness	0.274**	0.118	1.315	0.283**	0.120	1.327
-Log likelihood	*275.385*			*268.710*		
Nagelkerke's R^2	*28.2*			*31.1*		
Omnibus Model χ^2	*56.91***			*63.58***		

* p < .05; ** p < .02; *** p < .01, N = 240
[a] Claim was dummy coded with 0 = Prevention-focus and 1 = Promotion-focus
[b] Data was dummy coded with 0 = Absence of data and 1 = Presence of data

Table 7. Binary Logistics Regression

We also computed the average marginal effects of claim and claim-supporting data on online verification conversion rate (see Figure 10). While the average marginal effect of claim was not significant (as was the coefficient estimate in the logit regression analysis), the average marginal effect of data was 30.9 percentage points. That is, everything else equal, we would expect a 30.9 percentage point increase in online verification conversion if we add claim-supporting data to a claim.

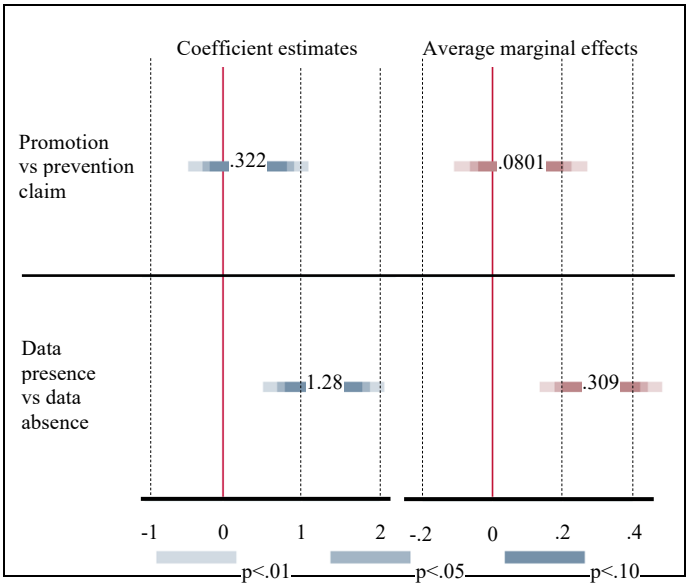

Figure 10. Average Marginal Effects

Model II shows that with inclusion of the interaction effect, the odds of online verification are almost 3 times larger for promotion-focus claims than the odds for prevention-focus claims (b=1.079, Wald statistic (1)=6.371, p<.02) in absence of data. However, if data is added to the claim, the conversion rate for prevention-focus outperforms that of promotion-focus, supporting H3B. This is captured by our negative interaction effect (b=-1.533, Wald statistic (1)=6.514, p<.02), suggesting that the effects of claim and data are contingent on the presence of each other. The effect of data still remains highly significant, indicating that claim-supporting data, via third-party assurance seals, has the potential to further increase conversion rate, independent of the type of claim.

4.6. Discussion

The objective of this paper was to shed light on how the online verification conversion rate on digital platforms can be increased by nudging users through the use of communication arguments. In order to achieve this, we developed an experiment in the context of an online platform. We manipulated claim and claim-supporting data to assess the effect of promotion- and prevention-focus framed arguments displayed during a typical identity verification process. The arguments consisted of two components, namely assurance statements as claim and third-party assurance seals as claim-supporting data.

If neither claim nor data is displayed during the user identity verification process (control group), the average online verification conversion rate is 41%. Despite the convenience and security as aspect of online verification, interviews with a carsharing player revealed that the

high use of offline verification can be partly explained by users' geographic proximity to a brick-and-mortar verification station at time of the registration. If verification stations are nearby, the effort for offline verification decreases and thus offline verification convenience increases. In addition, many consumers favor the personal interaction during verification processes. However, once a promotion-focus claim is displayed during the user identification process without claim-supporting data, the online verification conversion rate increases to 43%. If a prevention-focus claim is displayed without claim supporting data, online verification conversion rate is actually reduced to 23%. Thus, in a prevention-focus scenario a claim aiming to reduce privacy concerns actually reduces the conversion rate, potentially by increasing awareness of threats of online verification methods and hence perceived risks (Nemati and Dyke 2009). In this case, offline ID verification may seem more favorable from a security aspect. On the one hand, the insignificant difference in conversion rate between promotion-focus claim and control group might indicate that users are already aware of the benefits of online verification. On the other hand, it may also imply that users are less concerned about potential benefits of products and services provided by online vendors, but rather worry about fraudulent behaviors of online vendors including misuse of their personal information and transaction related information (Olivero and Lunt 2004), thus supporting the negative effect of prevention-focus claim. However, once assurance seals are added to the claim as supporting data, the online verification conversion rates for both promotion- (59%) and prevention-focus (69%) arguments exceeds that of the control group. The effect of data is in line with previous findings where assurance seals have proven to positively influence consumer transaction behavior (e.g., Park et al. 2010; Zhang 2005). This suggests that communication arguments can increase online verification conversion rates on digital platforms, depending on the structure and framing of the argument.

When directly comparing the effects of promotion- and prevention-focus arguments, we evidence a negative interaction effect of claim and data across both arguments. While online verification conversion rate is greater for the promotion- (43%) compared to the prevention-focus claim (26%) in absence of data, the effect is reversed in the presence of data. More specifically, in the presence of data online verification conversion rate of the promotion-focus argument increases only to 59%, while that of prevention-focus rises up to 70%. Thus, prevention-focus claims are more likely to have users opt for online ID verification compared to promotion-focus claims if they are supported with data. This is in line with existing research on the effect of third-party assurance seals, which can affect consumer's purchase intention by reducing their concerns about the risks in online shopping (e.g., Kimery and McCord 2002).

Finally, our data analyses revealed that personal characteristics such as personal innovativeness and privacy concern significantly influenced users' decision to verify online. This is in line with previous research suggesting that personal innovativeness in information technology has a significant effect on behavioral intention (Jackson et al. 2013) and web utilization (Davis and Yi 2012). Similarly, consumers who are concerned about their online privacy will be unwilling to disclose personal data to websites (Nam et al. 2006; Wirtz et al. 2007). Although the study was set in the context of carsharing, findings may also be applied to other industries, providing a foundation for future research in the area of cyber security and online verification technologies.

4.6.1. Implications for Research

This study makes several important contributions to existing research. First, this study contributes to the scant literature on digital nudging, following the call of Weinmann et al. (2016) for more research in this area. Historically, nudging has mainly focused on the offline context. However, the importance of digital nudging, particularly in the context of human behavior in IS research, can be expected to significantly grow in the future as users are increasingly making more decisions on digital interfaces. Thus, understanding how web page design can influence user behavior will become even more critical. We complement this stream of research by investigating the potential by employing nudges to have users verify their ID online through the use of communication arguments on online platforms. Second, we complement existing research on human behavior in IT by combining assurance statements as claims, framed along motivational decision principles, with assurance seals as data. While previous literature around assuring mechanisms has mainly focused on the separate effect of arguments (e.g., Pavlou and Gefen 2004; Pennington et al. 2003; Suh and Han 2003; Malhotra et al. 2004) and third-party seals (e.g., Hu et al. 2010; Kim 2008) conveying perceived privacy and security, we assessed the combined effects of arguments and seals on actual behavior. This holistic way reveals novel interaction effects that have been neglected so far in past research and provides the foundation for future research on the combination of different assurance mechanisms. Third, this study combines psychological elements from RFT with Toulmin's model of argumentation to test the relationship between communication arguments and users' decision to verify their ID online. Previous research has mainly focused on the use of security- and privacy-related assurance mechanisms and their effect on user trust (e.g., Arcand et al. 2007; Bansal et al. 2015; Hu et al. 2005).

Our study extends previous literature by showing a counterintuitive relationship between prevention-focus claim and online verification conversion rate in absence of data when directly comparing two oppositely-framed communication arguments. In particular, we extend the findings of Kim and Benbasat (2006) by highlighting the need for data that provides necessary evidence to support a claim in case of prevention-focus claims. We find that promotion-focus claims have a stronger effect on online verification conversion rate if displayed in absence of claim-supporting data. However, the effect is reversed on claim-supporting data via third-party assurance seals is added. Therefore, we suggest that considerations regarding structure (claim and data) and framing (prevention- and promotion-focus) of digital nudges should be made jointly. Finally, this study contributes to research on digital platform business models. Previous research in emerging digital business models, such as the Sharing Economy, has rather concentrated on more transactional factors influencing the decision to engage with the other party, such as trust-related factors (e.g., Ert et al. 2016; Abramova et al. 2015). This study focuses on prerequisite activities users must undergo before the actual transaction occurs, such as ID verification before usage of the actual service or product. Therefore, extending the research focus towards more antecedent activities in the user conversion funnel may represent further research avenues to improve consumer satisfaction and reduce user drop-out from the funnel.

4.6.2. Implications for Practice

From a practical perspective, this study has two major implications for digital platform operators. First, we provide an orientation as to what information businesses should display during user registration processes to increase conversion rate. Our results show that online verification conversion rate for ID verification as part of the user registration processes can be increased through the combined use of assuring claims and data. While both convenience- and privacy-conveying arguments can be used, digital platform operators should opt for the latter type of argument as the conversion rate is slightly higher. However, if they are not able to obtain a third-party assurance seal to support their privacy claim, then they should opt for a convenience-framed claim. A security claim without sufficient backing may not be perceived credible and could even result in a lower online verification conversion rate compared to if no claim or data were displayed. While these findings generally hold for different digital platforms (e.g., carsharing, bank account opening, etc.), they might be particularly useful to smaller companies or start-ups which do not have the resources to establish fully-fledged user

registration processes early on to generate a critical mass of initial users. Increasing online conversion rate will further help businesses to streamline and digitize their processes, increasing organizational efficiency while simultaneously improving user experience. Second, our findings indicate that several character traits are also likely to have an influence on users' decision to opt for online versus offline ID verification. For example, users with high privacy concerns are only half as likely to verify online compared to users with low privacy concerns. Hence, in countries with rather high Internet privacy concerns, digital platforms requiring ID verification should carefully design privacy-conveying claims and support them with third-party assurance seals in order to increase the proportion of users who verify online. Similarly, digital platforms should reduce privacy concerns early on in registration processes in addition to displaying them only in the moment when the ID verification decision is made.

4.6.3. Limitations, Future Research and Conclusion

Our findings should be interpreted in light of some noteworthy limitations, which simultaneously might represent future research avenues. First of all, results were obtained within an experimental setting and therefore do not represent actual transaction behavior. Even though participants rated the experimental setting as realistic, it would be interesting to test the effect of prevention- and promotion-focus arguments in a field experiment with real users during registration on digital platforms (e.g., on DriveNow). The second limitation is the number of moderators included in the model. Only one moderator was included, namely data, represented by a third-party assurance seal. Further studies should integrate backing as an additional argument component given that it has been excluded from Toulmin's (1958) argument structure in this study. This also entails a closer dependence of claim and supporting data, for example by adding claims such as "online verification is trustworthy" (prevention-focus) or "online verification is easy" (promotion-focus). Similarly, additional factors or a modification of the third-party assurance seal should be investigated, such as a variation of data types including textual statements or user reviews. Third, our study is based on a rather homogeneous group as all subjects have been recruited from the US via Amazon Mechanical Turk.

To generalize our study results, it will be necessary to conduct studies in broader settings, such as on a multi-country level. For example, participants living in the US may be considered more open towards new technology, potentially resulting in lower overall privacy concerns. Future research on communication arguments in the context of online ID verification should introduce

mediators to understand the cause of the observed effects of promotion- and prevention-focus arguments. Potential mediators may for example include perceived usefulness of online verification mechanisms and trust in the online platform operator. In addition to that, studies should integrate further psychological aspects when designing arguments or nudges. For example, studies could first assess users' motivational decision-making orientation and then display individualized nudges depending on the outcome to increase conversion rates. Finally, introducing digital nudges to increase online verification conversation rate should also be explored in further contexts beyond carsharing platforms as these findings may be applied on a more universal level.

4.7. Conclusion

Recent developments in IT and the digitization have brought forward new business models disrupting traditional ways people consume products and services. Despite the rapid growth of online business models, the role of Internet-based ID verification has largely remained unexplored. This study highlights the importance of communication arguments framed to convey privacy and convenience of online verification to increase use of online over offline ID verification on online platforms. Arguments displayed should be supported by data to increase their credibility and hence their effect on online verification conversion rate. More specifically, displaying privacy arguments without supporting data is likely to have a negative effect on online verification conversion rate, while convenience-framed arguments consisting of claim only do not have a significant effect at all. However, if data and claim are simultaneously present, their effect is complementary but not equally strong across claim types. In absence of data, convenience-framed claims have a greater effect on online verification conversion rate, but once data is added the effect is reversed and privacy-framed arguments become more effective.

Overall, this study is an initial step towards understanding the dynamic interplay between structure of and framing of communication arguments to increase online verification conversion rate on online platforms. We hope that our results provide impetus for further analysis of interdependencies between the design of digital nudges and behavioral factors, and give actionable recommendations to online platform providers.

5. Nudging Users into Electronic Identification Adoption: The Case of E-Government Services

Title
Nudging Users into Electronic Identification Adoption: The Case of E-Government Services

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Abstract
With the ubiquity and prevalence of advanced technologies in society, transactions have become increasingly digital, requiring new user identity verification mechanisms. Electronic identification (eID) enables user identity authorization in online environments. Although eID plays a central role in government initiatives worldwide to digitalize citizen transactions, eID adoption remains surprisingly low. Drawing on digital nudging theory and e-government literature, we examine how eID adoption can be increased by changing the decision environment in which users choose eID. In a controlled experiment with 161 participants, we investigate the effect of default options (eID vs. offline ID as default) and popularity signals (presence vs. absence of social proof) on users' eID adoption behavior. Both nudges increase eID adoption, but default options are a double-edged sword as they simultaneously fuel privacy concerns towards the government, attenuating the effect of default option on eID adoption. These concerns can be mitigated by adding social proof cues.

Keywords
eGovernment, Digital Nudging, Choice Architecture, Default Option, Social Proof, Adoption, Privacy Concerns, eID

5.1. Introduction

With the accelerating penetration of societies with advanced technologies, transactions among people are increasingly conducted in online instead of offline contexts. As a result, new identity verification mechanisms are required to ensure information reliability, especially for guaranteeing validity of personal information shared in digital environments. Identity verification mechanisms refer to processes by which users can verify their personal identity documents (IDs). With the growing use of digital services in both private and public sector, electronic identification (eID) emerged as important enabler of data protection and the prevention of online fraud to increase transparency and trust among users in online environments. eID refers to a means for people to prove electronically that they are who they say they are and thus gain access to services, allowing entities (citizen, business, administration) to be distinguished from any other (European Commission 2018a).

EID is a key enabler to secure access to online services and carry out electronic transactions in a safe way (European Commission 2018a), entailing benefits for both the private and public sector. In fact, it has the potential to unlock efficiency gains and savings of €11 billion per year (European Commission 2018b) by improving transaction efficiency in government processes through standardizing processes related to social security, driver licenses, healthcare and payments. Furthermore, research by the McKinsey Global Institute (McKinsey 2019a) finds that countries implementing eID could unlock economic value equivalent to 3-6 percent of GDP on average by 2030, making eID a potential force for inclusive growth, especially in emerging economies. As a result, many governments have incorporated information and communication technologies to drive digitalization of government processes, also known as e-government (Sánchez-Torres and Miles 2017). However, significant differences in the adoption of e-government services exist among countries. For example, the proportion of individuals using the Internet for interacting with public authorities in the EU ranges from more than 80% in Nordic countries to less than 30% such as in Bulgaria, Italy or Romania (Eurostat 2018). China is currently testing an eID system through WeChat, the local messaging service with 980 million registered users representing 70% of China's population (cnet 2017). The US does not have a national eID scheme yet, but several pilots were launched in the past two years to explore the technical feasibility of a digital driver's license (Gemalto 2018). These examples show that adoption of e-government services varies, highlighting the significant potential for eID solutions on a global level to promote trust and unlock operational efficiencies.

Studies from leading research organizations confirm that there is still significant room for improvement to drive eID adoption, which is often restricted due to limited functionality, poor

user experience, and difficulties coordinating across stakeholders (McKinsey 2019b). Similarly, a study from Capgemini (Capgemini 2017) claims that e-Government adoption is still low with only 14% of citizens and 29% of businesses being registered to such a system in 2016. Lack of trust as well as security and privacy concerns have been identified as major barriers to successful e-government adoption (Yang and Maxwell 2011; Lips et al. 2011; Fan et al. 2014). This suggests that purely emphasizing the benefits of e-government services may not be sufficient to increase e-government adoption. Thus, to increase the use of e-government services, the decision environment in which citizens digitally interact with governments must be designed in ways that not only highlight the benefits, but also mitigate potential privacy concerns of digital government services.

A change in a user's decision environment, which is intended to "gently [encourage] (someone) to do something", is considered a nudge (Oxford English Dictionary 2018). A widely-known nudge (at least among men) are small, photorealistic images of flies placed in urinals near the drain to reduce "spillage" around urinals by giving people something to aim at. Governments are also known for employing nudges to steer people in particular directions while preserving their freedom of choice (Sunstein 2015). Previous nudging research has largely neglected the e-government context and rather focused on analogue government environments. The most prominent nudging examples in both academia and practice are default options and social proof cues (Mirsch et al. 2017). A default option is a pre-set course of action that takes effect if nothing is specified or changed by the decision maker (Thaler and Sunstein 2008). Defaults have been employed by governments to increase pension plan and organ donation participation rates (Madrian and Shea 2001; Johnson and Goldstein 2003). Social proof describes the influence exerted by other people on individual's behavior. For example, research showed that governments were able to significantly increase tax payments by displaying a message indicating that the majority of citizens paid their taxes on time (Palmer 2014). However, previous research has largely neglected to examine these effects in digital contexts. As government transactions with their citizens are increasingly shifting online, we follow the call for more studies in the realm of designing digital user interfaces in the context of e-government (e.g., Weinmann et al. 2016). Since eID represents a central pillar in e-government transformation, this study intends to depart from prior research by applying default option and social proof nudges to drive eID adoption. Moreover, we demonstrate that nudges do not exist in a vacuum and may influence each other. Thus, we also provide empirical support above and beyond the already explored default option and social proof effects, expanding research on how these two nudges interact with each other in the context of technology adoption.

Nudging has demonstrated to influence user behavior in digital environments by adjusting user-interface design elements including graphic design, specific content, wording or small features (Weinmann et al. 2016). For example, the use of design elements on websites has demonstrated to influence online buying decisions (Amirpur and Benlian 2015) and increase conversion on digital platforms (Schneider et al. 2017; Koch and Benlian 2016). Based on findings from nudging in offline government contexts and learnings from digital nudging applications, we assume that eID adoption can be increased by employing nudges in form of defaults and social proof.

However, studies have shown that online users may perceive default options as signals or implicit recommendations from policy makers (McKenzie et al. 2006), thereby inferring that policy makers are trying to nudge users into opting for the preselected default option. This concern may be particularly relevant in the case of eID, where the collection and sharing of users' personal information is facilitated through the use of new technology. As a result, citizens' perceptions of freedom and personal control might be reduced with the emergence of eID, raising potential privacy concerns towards the government. Therefore, we presume that seeing a default option imposed by the government may trigger negative experiences and, thus, raise privacy concerns, reducing the effect of default options on eID adoption. Hence, potential privacy concerns resulting from the use of default options must be mitigated for the nudge to fully exploit its potential. This culminates in the following research questions:

RQ1: Do default options and social proof cues increase eID adoption?
RQ2: If default options increase users' privacy concerns, how can the effects of the latter be mitigated?

To answer our research questions, we drew on nudging theory in IS (e.g., Weinmann et al. 2016; Schneider et al. 2017) and e-government research (e.g., Alzahrani et al. 2016) and employed two nudges, default options and social proof cues, in the context of e-government. More specifically, we conducted a vignette study with 161 participants by employing a 2x2 between-subjects design. Our results show that default option and social proof have a positive effect on eID adoption. While both nudges have a positive influence, the effect is strongest when both nudges are applied together. We also find that default options act as a double-edged sword as they simultaneously increase privacy concerns, reducing the effect on eID adoption.

However, once social proof is combined with a default option, the effect of privacy concerns on eID adoption is cancelled out.

5.2. Theoretical Background and Related Literature

5.2.1. E-Government and eID

Over the last decades, many governments around the world have implemented e-government solutions with the objective to improve efficiency, cost effectiveness, and transparency between citizens and public agencies and authorities (e.g., Katz and Hilbert 2003; Heeks 2003). The recent UN-E-Government Survey 2018 (United Nations 2018) showed that European countries lead e-government development globally. Americas and Asia share almost equal standing in high and middle e-government index levels, and many African countries continue to struggle to improve their e-government standing.

Given the significant financial returns of digitalizing government processes, e-government should be at the top of the agenda. E-government refers to government's use of technology, particularly web-based Internet applications, to enhance the access to and delivery of government services to citizens, business partners, other agencies, and government entities and has the potential to help build better relationships between government and the public by making interaction with citizens smoother, easier, and more efficient (McClure 2000). Interlinking government activities closer with citizen needs via advanced technologies can help build trust between governments and citizens (e.g., Makene 2009; Sarrayrih and Sriram 2015). Trust, in turn, represents an essential factor in good governance by using Internet-based strategies to involve citizens in the policy process. One of the key enablers for e-government services is electronic identification (eID).

According to the Digital Agenda for Europe, eID can secure cross-border electronic transactions and is a central building block of the Digital Single Market, namely moving from 28 national digital markets to a single one. More than 50% of EU28 members are already using some kind of eID scheme (European Commission 2018c). More specifically, eID technologies have been identified as key enabler and prerequisite to ensure successful and efficient e-government adoption (Průša 2015). EID describes the process of using personal identification data in electronic form uniquely to represent either a natural or legal person, or a natural person representing a legal person (European Parliament 2014). To promote the adoption of eID services, the EU issued a regulation creating a standard framework for the cross-border use of electronic means of identification and trust services including provisions on electronic

identification and electronic trust services which are binding for all EU member states. Although several researchers have pointed out the potential benefits of e-government, citizen sign-up rates for e-government services remain conspicuously low. On the one hand, trust (Janssen et al. 2018), security and privacy concerns (Palanisamy and Mukerji 2011) have been identified as critical factors limiting e-government adoption by citizens as they result in increased skepticism and mistrust in e-government initiatives (Belanger and Hiller 2006). For example, Denmark was among the first who presented the idea of a universal eID as a tool for authorities to access personal information which failed due to privacy concerns. The two main information privacy concerns of citizens were possible (mis)use of the card by government authorities and the mandatory nature of the card. The conflict eventually led to the infinite postponing of the deployment of an eID and to a technological revision of the design (Hoff and Hoff 2010). Thus, protecting citizens' information privacy has become a priority for governments in building citizen's trust in e-government initiatives (Alawneh et al. 2013). On the other hand, the user experience of such services plays an equally important role in e-government adoption (Kumar et al. 2017). In the next section, we will therefore discuss the concept of nudging, which can be applied to increase user experience quality and change behavior of decision makers in digital environments.

5.2.2. Digital Nudging

A nudge "is any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives" (Thaler and Sunstein 2008, p. 6). To be effective, nudges exploit specific heuristics by adjusting the decision environment and, thus, use and exert specific underlying psychological effects. Whereas traditional economic theory postulates that humans act rationally, nudging works because humans are prone to biases. More specifically, research in psychology has shown that human decision-making is inhibited by bounded rationality (Simon 1955) and that various heuristics and biases influence these outcomes (Tversky and Kahneman 1974). According to Weinmann et al. (2016), common heuristics include availability (for example being influenced by the vividness of events), anchoring and adjustment (for example using the default values) and representativeness (for example relying on stereotypes) (Tversky and Kahneman 1974). These heuristics often affect the evaluation of alternatives, leading to suboptimal decisions (Weinmann et al. 2016). The objective of nudges is to counter or encourage the use of heuristics by changing the choice environment to alter the behavior of the decision maker. Some of the

more prominent nudges include the use of incentives, providing feedback or anchors and setting defaults (e.g., Dolan et al. 2012; Johnson et al. 2012; Michie et al. 2013; Thaler and Sunstein 2008).

Although nudges have been successful in achieving better and more predictable results, research related to nudging has been mostly conducted in offline contexts (Schneider et al. 2017; Weimann et al. 2016). However, the increasing use of digital technologies has led people to frequently make decisions within online environments. Nudging in digital settings refers to the use of user-interface design elements to guide people's behavior in digital choice environments (Weinmann et al. 2016). The choice architecture of online environments may include features, such as website designs, warnings, and defaults (Sunstein 2014). For instance, the use of website design nudges has confirmed to enhance website stickiness (e.g., Benlian 2015), increase online verification adoption on platforms (Schneider et al. 2017) and improve consumer referral behavior (Koch and Benlian 2015).

Moreover, digital nudging is further built upon human computer interaction (HCI) research, which evaluates the influence of information system relevant features on user behavior. Studies in HCI research have mainly investigated only a few selected heuristics and biases from behavioral economics, such as endowment effect, loss aversion (Gunaratne and Nov 2015) or the status quo bias (Goffart et al. 2016). However, with the rise of digitalization, technology increasingly infuses and penetrates individuals' societal online and offline environments, such that users are confronted with information privacy conflicts on a daily basis. The application of website design and information quality improvements has shown to reduce potential security and privacy concerns in e-government adoption, thereby increasing trust and reducing resistance to change (Lallmahomed et al. 2017). We conducted a systematic literature review to investigate how digital nudging has thus far been investigated in privacy-related contexts (see Appendix Table 4). We found that research has only recently started to examine how digital nudging in information privacy choice architectures affects individuals' behavioral outcomes (e.g., Adjerid et al. 2018). While some research has focused on high-level and abstract outcomes such as cross-cultural effectiveness (Dogruel 2017) and ethical questions (Rubel and Jones 2016), a large body of privacy-related research has investigated how digital nudging affects behavioral outcomes such as user self-disclosure (Kroll and Stieglitz 2019; Cao et al. 2018, Cavusoglu et al. 2016; Adjerid et al. 2018), product ratings (Wang et al. 2018), and financial investments (Looney et al. 2009). Moreover, research on digital nudging in privacy choice environments has been predominantly focused on information disclosure within social networks (Kroll and Stieglitz 2019; Dogruel 2017; Cao et al. 2018), while largely neglecting

how digital nudging can be employed for digitalized governmental services. Thus, our research aims towards filling this gap and investigating digital nudging in e-governmental privacy choice environments, as it holds the potential to effectuate better adoption outcomes for e-government services. In this respect, while in practice default options and social proof cues have gained prominence as effective nudges. However, their effect has not yet been investigated in an e-government and especially not in an eID context.

In addition, the interaction of the two nudges has so far been insufficiently studied. As a result, we devote our study to the investigation of nudges in e-government decisions by analyzing how modifying the user interface of digital decision environments can improve the acceptance and selection of e-government-related services. In the following sections, we turn to default options and social proof cues as the core digital nudges investigated in our study.

5.2.2.1. Default Option as Digital Nudges

A default (option) is defined as "an option that will obtain if the chooser does nothing" (Thaler and Sunstein 2008, p. 83) or "the alternative the consumer receives if he/she does not explicitly request otherwise" (Brown and Krishna 2004, p. 530). People are prone to stay with a predefined default option in contrast to selecting a different option (e.g., Dinner et al. 2011, Sunstein 2015), such that default options have demonstrated to be successful nudges in various offline environments such as investment (Cronqvist and Thaler 2004; Madrian and Shea 2001), insurance (Johnson et al. 1993), and marketing (Goldstein and Johnson 2008), but are particularly prominent in public policy studies (e.g., Brown and Krishna 2004; Carroll et al. 2009, Johnson et al. 2002, Johnson and Goldstein 2003). Public organizations regularly apply default policies to nudge people in a way that governments were able to significantly increase retirement plan participation (e.g., Choi et al. 2003; Madrian and Shea 2001), improve people's eating behavior (Downs et al. 2009) and raise consumers' participation rates in online research projects (Johnson et al. 2002). However, previous studies have examined default options mainly in an isolated manner without investigating how they interact with other digital nudges, although there is the intriguing possibility that digital nudges serve as complements or substitutes to each other (Klumpe et al. 2020). This leaves a research gap that we aim to bridge with our research in the e-government context.

The two main default policies used in designing choice architectures are opt-in and opt-out. In the opt-in policy, the individual has to actively state their option and, thus, the individual choice has to be explicit. Conversely, in the opt-out policy the individual choice is presumed, and the

individual is automatically assigned to the default option unless the user requests an alternative. For example, countries who applied a presumed consent policy (i.e., opt-out) for organ donation observed significantly higher organ donation rates compared to countries who employed a default opt-in policy (Johnson and Goldstein 2003, 2004). Johnson and Goldstein (2003) demonstrated that opt-out policies result in almost twice as high organ donation rates in contrast to the opt-in policies. Differences in opt-in and opt-out responses are an important element of the current public debate concerning online privacy and more generally for permission marketing (Johnson et al. 2002). Although the power of defaults is settled (Thaler and Sunstein 2008) and opt-out policies tend to yield higher levels of user compliance with the desired option, the underlying mechanisms and circumstances nudging users to comply with the default option are still ambiguous (e.g., Carroll et al. 2009; Keller et al. 2011). Additionally, individuals' experiences from past default decisions influences future default acceptance (Haan and Linde 2018) and unsolicited advice may lead to reactance (Fitzsimons and Lehmann 2004). As a result, individuals may deviate from the choice architect's intention, especially when the user disagrees with the ceding control of the choice architect (e.g., Brown and Krishna 2004; Chapman 2004). Consequently, in contrast to the prevailing assumption that defaults are in the interest of the decision maker and grant individuals unrestricted freedom of choice (Thaler and Sunstein 2003, 2008), default options may backfire. A central element of the controversy surrounding privacy concerns (i.e., users' "concerns about possible loss of privacy as a result of information disclosure to a specific external agent" (Xu et al. 2011, p. 800)) in digital contexts as well as the role of potential government regulation is the action required by consumers for them to express their preferences. The General Data Protection Regulation (GDPR) which took effect in May 2018 limits how personal information may be collected and reused as well as how it is processed. For example, users must specifically consent by opting-in into any program (as opposed to opting out) that gathers private information including demographics and purchase histories and not to opt-out (EU 2016/679). Thus, consumers are required to give their consent to a predefined set of rules that regulate the way the information they shared can be used. The use of opt-out defaults may thus act as a double-edged sword, as it might help steer users towards a desired outcome, while on the other hand, it could prompt greater privacy concerns. This raises the theoretically and practically intriguing question how users' privacy concerns from (opt-in or opt-out) default options may be mitigated. One answer may be social proof to which we turn next.

5.2.2.2. Social Proof Cues as Digital Nudges

Social proof is an indicator that signals product demand and popularity (e.g., Amblee and Bui 2011; Amblee and Bui 2012; Cialdini 1993). Its effectiveness is based on the psychological effect of social norms that are defined as "rules and standards that are understood by members of a group and that guide and/or constrain social behavior without the force of laws" (Cialdini and Trost 1998, p. 152) and that emerge from "interaction with others; they may or may not be stated explicitly, and any sanctions for deviating from them come from social networks, not the legal system" (Cialdini and Trost 1998, p. 152).

Social orientation refers to watching other's actions and deriving the meaning and implications for one's own decision, since other's behavior is assumed to be based on sound reasoning (Naylor et al. 2011). In simple terms, people usually infer that a behavior is right when a lot of people do it and tend to follow that behavior (i.e., bandwagon effect) (van Herpen et al. 2009). In research, studies have demonstrated that social proof is an effective nudge when decision makers are uncertain about the social acceptance of a course of action and, therefore, tend to conform to the actions of relevant others (Rao et al. 2001). Through this heuristic, customers determine the value of options (Burnkrant and Cousineau 1975; Kelley 1967) as well as reasons to conform to previous selections (Goldstein et al. 2008; Zhang 2010). For instance, the Montana Department of Transportation successfully used social proof (i.e., claims such as "most of us wear seatbelts") to promote safe driving behavior (Center for Health and Safety Culture 2015).

In offline contexts, previous behavior of other customers is usually not directly observable. Thus, individuals consider available cues, such as the stock level of a product, as a trace of previous demand, to derive the popularity and value of the option and, hence, determine whether to select a product or not (e.g., Parker and Lehmann 2011; van Herpen et al. 2009). In online contexts, however, platform providers need to substitute these physical cues by other (digital) cues to indicate, for example, demand. In contrast to offline contexts, however, online contexts allow platform providers to easily track how many items have already been selected and sold. Therefore, in order to signal and make use of the effect of social proof, e-commerce companies often deploy social cues (e.g., ratings, reviews, purchase counters) on their websites. For instance, Amazon's product recommendations display social proof to further promote product purchase by highlighting what other customers have bought (i.e., "Customers who bought this item also bought") and, thus, setting a standard and rule that an individual may follow, considering the information possessed by other customers (Benlian et al. 2012).

Whereas social proof is a ubiquitous promotional cue that has been extensively analyzed in offline contexts and applied in online environments (e.g., Koch and Benlian 2015), to the best of our knowledge, this nudge has not been examined with its underlying mechanism in consumer privacy decisions and e-government contexts. Our study includes social proof as a digital nudge for two reasons. First, we use social proof to indicate how other website visitors have chosen in the past and, thus, create a bandwagon effect in favor of eID adoption. Second, we aim to shed more light on the effect of social proof on potential privacy concerns raised through the use of our first nudge, namely the opt-out default option.

Although plenty of research has been conducted around privacy concerns, literature mainly focusses on privacy concerns as an independent variable and has mainly neglected antecedents to privacy concerns and actual outcomes (e.g., Belanger and Crossler 2011; Li 2011; Benlian et al. 2019). In fact, the privacy paradox, which explains the counterintuitive behavior that users disclose information despite having high levels of privacy concerns, is still an intriguing yet under-researched phenomenon (Smith et al. 2011). Whereas previous research has only provided few insights into the role of social proof in privacy contexts, for example by indicating that simply showing people the number of friends that used privacy and control features drove viewers to explore promoted privacy features (e.g., Cao et al. 2018), virtually no study has systematically investigated the interplay between social proof and users' privacy concerns and its effect on behavioral outcomes. Moreover, during our literature review (see Table 4 in the Appendix), we found that the majority of research regarding digital nudging in privacy choice environments has been focused on online social network contexts, leaving important questions open with regard to the effectiveness of digital nudges in other privacy-sensitive contexts such as e-government. While we do not intend to resolve the privacy paradox, this study aims to provide important insights to decision-making in privacy-sensitive environments by investigating the relationship between social proof and privacy concerns in governmental contexts where users face information disclosure decisions.

5.3. Hypotheses Development and Research Model

Research has revealed that people respond to defaults and that pre-selections usually increase compliance with the selected option compared to no preselection (e.g., Felsen et al. 2013; Sunstein 2015). Studies have provided various reasons for this phenomenon: For example, users may be too lazy to consider alternatives or may consider the default option the legitimate choice or the one that indicates information about the architect, the marketplace or the society (Brown

and Krishna 2004). While the application of defaults can be found in several contexts, the use by governments has been particularly prominent. For example, governments were able to significantly increase retirement plan participation from 49% to 86% (Madrian and Shea 2001) by making saving for a pension an opt-out rather than opt-in arrangement. Similarly, countries that employed a default opt-in scheme for organ donation experienced significantly higher organ donation rates compared to countries that employed a default opt-out scheme (Johnson and Goldstein 2004). These findings have also been confirmed in online contexts. For example, the mobile payment app Square raised tipping amounts by nudging people into giving tips by setting the default to "tipping" so that customers must actively select a "no tipping" option if they choose not to give a tip (Carr 2013). Accordingly, we hypothesize that establishing a default option increases the share of users sticking with that option. Elaborating on the statement that different defaults lead to different outcomes (Johnson et al. 2002), we expect that different defaults (presence vs. absence of defaults) may lead to different user participation rates in eID solutions. Specifically, we anticipate that a pre-selection in favor of eID will be more successful in singing up users for eID in contrast to the condition in which no option is selected.

H1: The presence of eID as default choice option increases eID adoption compared to the absence of a default choice option

A central criticism of nudging is that it works by manipulating users' choice environments. Although Hansen and Jesperson (2013) have shown that nudging is not necessarily about "manipulation", nor about influencing "choice", applying nudges may nevertheless raise potential concerns as users might feel tricked or manipulated. Especially in the beginning of the 21st century, default options have received lots of attention due to their questionable usage in insurances on flight aggregator websites (e.g., Barry et al. 2013). This did not only lead to government interventions to counter the exploitive usage of those manipulations but also to online users becoming more cautious and mistrustful with respect to the use of defaults. At the same time, an increasing use of nudges by policymakers around the world has been observed (The Economist 2017). This seems quite counterintuitive, given that privacy concerns are playing an increasingly important role, especially in the light of recent events such as the Facebook-Cambridge Analytica data scandal in which personal data of millions of people have been harvested and used without the people's consent (The Guardian 2019). As a matter of fact, current polls show that only a third of Americans trust their government "to do what is right",

representing a decline of 14 percentage points from 2017 (Edelman Trust Barometer 2018). With the rise of e-government services, personal information can be collected, manipulated and used by multiple parties even more easily (Warkentin et al. 2002).

According to McKenzie et al. (2006), online users perceive default options as a signal from policy makers, which is interpreted as implicit recommendation. Thus, users are likely to infer that the policy maker has a motivation to nudge users' into choosing the preselected default option. On the one hand, users prefer to not switch the default option, while on the other hand, the default option might raise users' privacy concerns as eID enables policy makers to track user's behavior. Furthermore, when policy makers provide an implicit recommendation through a default option, which makes it easier to collect users' personal information, users might question the motivation of the policy maker to give such recommendations, leading to decreased eID adoption. More specifically, default options have shown to impact users' control over their personal data, thereby directly affecting users' privacy concerns (e.g., Kim et al. 2008; Xu and Gupta 2009). When applied to the governmental context, citizens' perception of control might be reduced with new digital services such as eID, raising potential trust and privacy concerns towards the government. While we believe that applying nudges in the government context are useful to steer citizens in a desired direction, we also presume that seeing a default option imposed by the government may trigger skepticism and, thus, raise privacy concerns, reducing the effect of default options on eID adoption. This leads to the following hypothesis:

H2: The effect of eID as default option on eID adoption is mediated by privacy concerns such that eID as default option increases privacy concerns and thereby reduces eID adoption.

According to Fishbein and Ajzen (1975), behavioral intentions are influenced by subjective norms based on compliance with normative expectations of referent individuals or groups, with whom the decision maker is motivated to comply with. As a result, external influences and the need for social correctness may increase the behavioral intention to use new technology (Karahanna et al. 1999). Moreover, customers take the choices of other users as a signal of social validation, suggesting high quality and social appropriateness of these decisions, which helps customers in determining which option they will select (e.g., Arndt 1967; Olshavsky and Granbois 1979; Duhan et al. 1997). Thus, social proof functions as a signal of reputation as well, leading to trust in the chosen option (Amblee and Bui 2011). In practice, online companies leverage the fact that people tend to follow each other's behavior to influence consumer

decisions by implementing social proof cues suggesting demand and popularity of certain products (Thies et al. 2016; Amblee and Bui 2011; Amblee and Bui 2012). Al-Shafi and Weerakkody (2010) showed that social influences also affect citizens' behavioral intentions towards e-government. Consequently, we expect that even in the relatively novel context of e-government decisions, social proof is an accepted signal of reputation and, therefore, increases the likelihood of the customer to choose an e-government option such as eID. We hypothesize as follows:

H3: The presence of social proof in favor of eID increases eID adoption compared to the absence of social proof.

According to Dinev and Hart's (2006) privacy calculus theory, a person's willingness to disclose personal information is influenced by four factors, namely anticipation of benefits, trusting beliefs, risk beliefs and privacy concerns. Higher privacy concerns normally result in lower degrees of user information self-disclosure and greater privacy-protective behavior. As postulated earlier, we believe that the application of defaults in an e-government context raises privacy concerns as citizens fear that governments utilize eID to access and potentially misuse personal data. Thus, privacy concerns are driven by the government's recommendation to opt for eID, not by eID itself. However, if eID was recommended by a more trustworthy source such as other citizens, privacy concerns around personal information shared should be lower. Previous research has unveiled that social proof cues increase users' trusting beliefs by signaling high popularity (Xu et al. 2008) and suggesting that users are missing out on a superior option (Koch and Benlian 2015). Furthermore, research demonstrated that social proof cues can override users' privacy concerns and increase users' information self-disclosure outcomes (e.g., Klumpe et al. 2020; Gu et al. 2017).

Users also interpret a default option as an implicit recommendation. Therefore, we argue that in absence of social proof, users infer that the policy maker provides a recommendation, which can lead to higher privacy concerns and lower eID adoption. In presence of social proof, however, the default option may also seem to be recommended by other users and based on actual social behavior, therefore reflecting the most popular option. Users should therefore be less likely to challenge the motivation of the provided default option. Thus, we believe that social proof mitigates the negative effect generated by privacy concerns resulting from governments' application of defaults. Although individuals may still have some privacy

concerns, they are more willing to opt for eID if they notice that other users have effectively done so before. Accordingly, we derive the following hypothesis:

H4: Social proof moderates the effect between privacy concerns and eID adoption such that it will attenuate or even cancel out the negative indirect effect of eID as default option on eID adoption via privacy concerns.

Our research model is depicted in Figure 11. H1 and H3 examine the direct effect of default option and social proof on eID adoption, while H2 investigates the role of privacy concerns in mediating the effect of default options on eID adoption outcomes. Finally, H4 assesses the role of social proof in the relationship between privacy concerns and eID adoption.

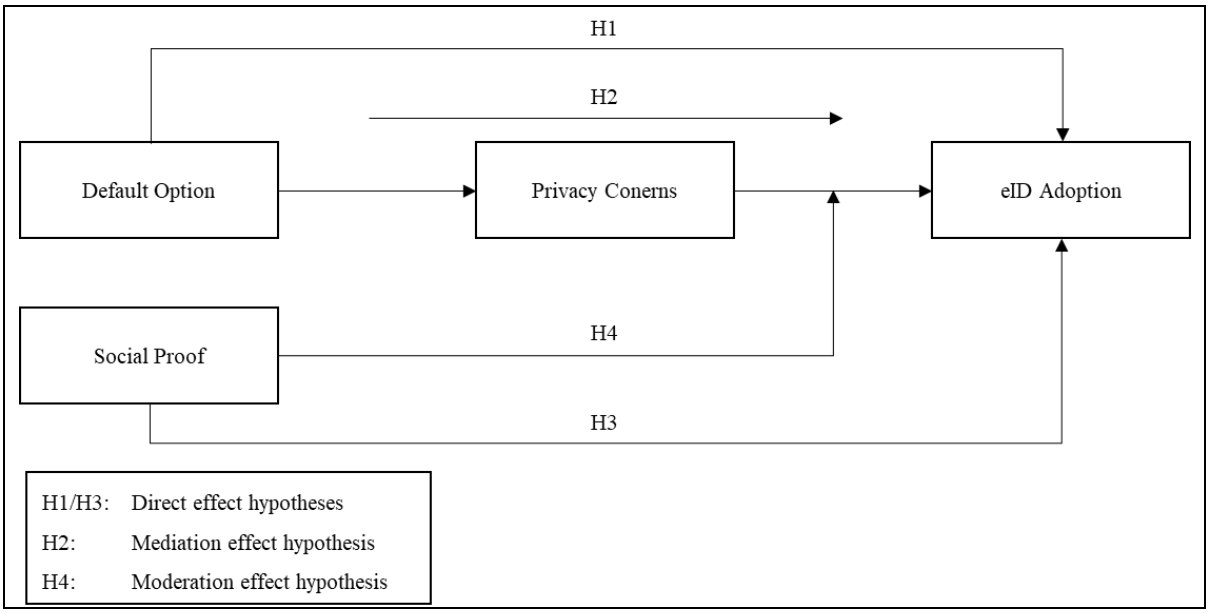


Figure 11. Research Model

5.4. Research Method

5.4.1. Experimental Design and Manipulation Checks

We employed a 2 (eID as default option: present vs. absent) x 2 (social proof for eID: absent vs. present) full factorial design with between-subject treatments to test our hypotheses. The treatments were manipulated based on vignettes depicted on a website embedded in an online survey. The vignette methodology was chosen for our experiment to control users' experience and avoid social desirability bias (Aguinis and Bradley 2014). Similar to lab experiments, vignette methodology comes with downsides such as artificial simplifications and hypothetical linear usage scenarios; however, it enables precisely employing manipulations, accurately

examining the effects on dependent variables, and identifying hypothesized causal relationships. This technique has also been demonstrated to be valid and effective in assessing individuals' perceptions of and reactions to specific information privacy- and security-related conditions (e.g., Lowry et al. 2017). This allows us to conduct both relative and absolute treatment comparisons within a single study and to get a fairly precise look at different treatment combinations. It further allows us to clearly isolate the individual effects of the two nudges, namely default options and social proof on eID adoption. Figure 12 provides an illustration of the resulting four experimental conditions.

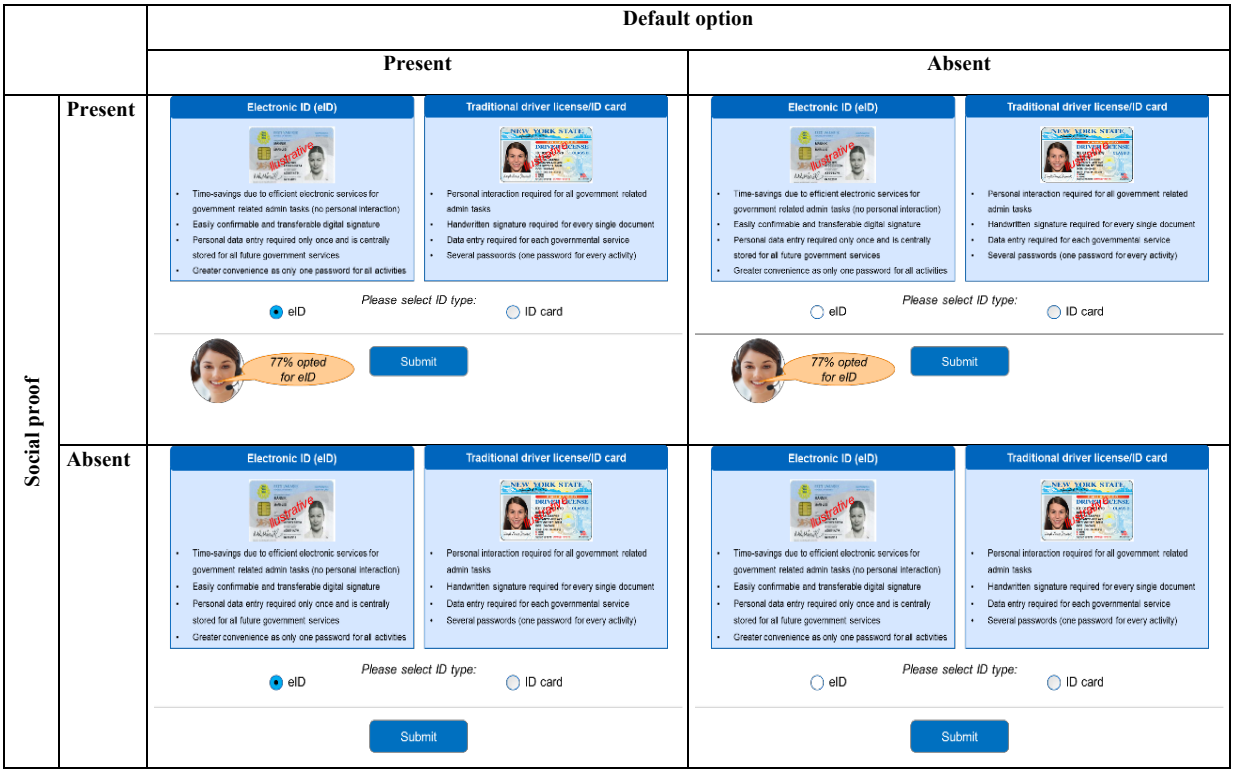


Figure 12. Four Experimental Conditions (2x2 between-subjects design)

The hypotheses were tested by means of an experimental set-up in the context of an ID renewal via a government website, in which participants were presented with an opt-in choice (e.g., Hogan et al. 2015) between eID and traditional ID. We introduced participants to the scenario of a governmental documentation renewal process, whereas the decision between eID and traditional driver's license recorded our dependent variable. This approach is consistent with previous studies assessing the effects of nudges in scenario-based experiments (e.g., Huh et al. 2016; Steffel et al. 2016; Theotokis and Manganari 2015). We drew on the experimental scenario methodology (e.g., Aguinis and Bradley 2014; Jin et al. 2012), which is widely used in IS research to specifically manipulate the default option and social proof. By using random

assignment of subjects to the experimental conditions, we also ensured that the four conditions were equivalent such that any differences between groups should be attributed to our manipulations and not to other confounding factors (e.g., users' dispositional privacy concerns). In the experiment, participants had to imagine they had to renew their driver's license, which also serves as ID in the United States and choose between a traditional ID and eID on a fictional government website. The website was a self-designed mock-up and reflected real government website functionalities. Examples from real government websites were used to design the mock-up and feedback from government officials was collected to refine its design. The website also included a description of the two ID verification options: eID and traditional ID card. To develop our stimuli and develop our scenario, we conducted a pretest before the actual experiment with 152 participants assigned randomly to the various conditions. In the main experiment, participants from the US were recruited from Amazon Mechanical Turk, an online marketplace for business services, and received a monetary compensation in exchange for their participation. It has been demonstrated that survey results from Mechanical Turk respondents have high reliability and provide higher-quality data than student or online convenience samples (e.g., Behrend et al. 2011; Buhrmester et al. 2011; Steelman et al. 2014). In addition, Mechanical Turk is a suitable platform to reach Internet-savvy users, who represent an adequate fit with our survey setting as the majority of US citizens still uses their traditional ID card or driver license and may thus be confronted with an eID solution in the future. We restricted participation to users from the US with a high reputation (at least 95% approval rate), which is a sufficient measure to ensure high data quality (Goodman and Paolacci 2017).

The experiment was conducted in four major steps. In the first step, participants received a short introduction to the increasing relevance of technology to improve government activities and the importance of eIDs in that respect. Furthermore, they were also informed that the result of this experiment would be used to refine real e-government websites. In the second step, in line with previous research (Nederhof 1985), we asked participants to put themselves in the position of a fictional citizen (Caroline – who needed to renew her driver license), to overcome potential response biases and yield more truthful answers. Caroline visits a government website and learns about a government initiative to introduce eID and that citizens can choose between the traditional driver license/offline ID and the new eID. In the third step, participants were randomly assigned to one of the four experimental conditions in which participants had to decide whether to opt for traditional or eID which recorded our dependent variable. By recording an actual choice between a traditional and an eID driver license within a realistic e-governmental scenario, we aimed to elicit more honest and deliberate responses. Participants

were made aware that information collected in the experiment was treated anonymously and confidentially. A short description of the two ID options was additionally provided to mirror current practices of a government website and for the experimental setting to be considered truly realistic. Finally, the experiment was integrated in a broader questionnaire, which was used to collect data for the variables included in the research model. Controls, demographics and other variables likely to influence users' decision behavior in the experiment were surveyed after the experiment. Thus, all privacy-concern measures were specifically related to privacy data "collected" on the fictional government website. Figure 13 provides a summary of our experimental procedure.

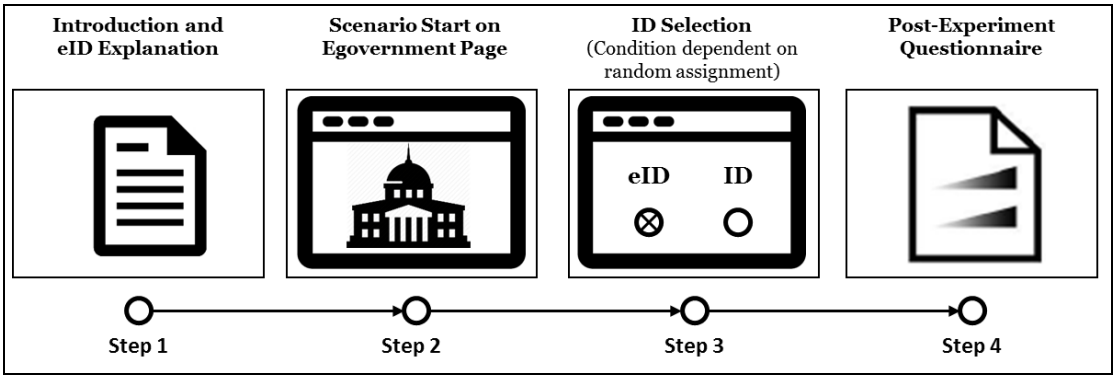


Figure 13. Experimental procedure

Manipulation of the two independent variables, default option and social proof, was conducted on the eID vs. traditional ID user decision page, which followed directly after the description of the two ID options. Participants were randomly assigned to one of the four conditions resulting from the combination of default option (unselected vs. eID preselected) and social proof (present vs absent). Below each outcome, a radio button was shown for participants to select eID vs traditional ID. In the default nudge outcome, the eID radio button was preselected. In the social proof outcome, additional information stating "77% opted for eID" was provided, which was displayed below the eID radio button.

5.4.2. Dependent and control variables

The dependent variable is binary (eID = 1; traditional ID= 0) and is used to calculate the eID adoption for the different conditions, defined by a point estimator P based on:

$$P\ (eID\ adoption) = \frac{\sum_{k=1}^{n} x_k}{n}$$

where n denotes the total number of participants in the respective conditions and xk is a binary variable which equals 1 when a participant selected eID and 0 for traditional ID. Furthermore,

we measured our mediator variable privacy concerns along with the following control variables: socio-demographic (age, gender, occupation and education), familiarity of product class, perceived ease of use, perceived usefulness and personal innovativeness (see Appendix Table 1, 2 and 3). We used Johnson and Russo's (1984) construct to measure familiarity with product class with regard to previous knowledge of eID. The global information privacy concern construct (Malhotra et al. 2004; Smith et al. 1996) was employed to measure users' privacy concern. All items were measured on a 7-point Likert scale. Finally, to validate our mechanisms we employed a set of manipulation check questions. First, we recorded perceived popularity ("I think that many people want to redeem the eID option" based on Van Herpen et al. (2009), on a 7-point Likert scale) as manipulation check for our social proof manipulation. Second, we recorded for each condition if participants noticed a preselection as manipulation check for our default options manipulation ("Was there a specific option preselected as default?"). These checks ensured that participants correctly understood the information provided. Also, the participants' answers on perceived degree of realism and overall understanding of the questions stated and information shown was assessed.

5.5. Analysis and results

5.5.1. Sample description, controls and manipulation checks

We invited in total 173 individuals from Amazon Mechanical Turk. Based on attention check questions, we removed 12 participants from our final sample, so that we used 161 subjects for our final analysis. Participants' average age was 38, ranging from 20 to 70. To assure a successful randomization to the four experimental conditions, we conducted several one-way ANOVAs. The ANOVAs unveiled no statistically significant relation ($p > .05$) between our experimental conditions and the variables used for our analysis. Furthermore, we compared the late and early-respondents to check for a non-response bias (Armstrong and Overton 1977). Therefore, we conducted t-tests on socio-demographics between the first and last 50 participants which unveiled no statistical significance ($p > .05$) between them, making it unlikely that a non-response bias affected the results. Our manipulation checks further indicated that participants perceived greater popularity of eID in presence of social proof ($M = 5.94$; $SD = 1.24$) compared to an absence ($M = 4.98$; $SD = 1.67$; $F = 18.71$; $p < .001$). Further, participants with default option were more likely to recognize a preselected default ($M = .84$; $SD = .37$) than participants without a default option ($M = .03$; $SD = .17$; $F = 278.51$; $p < .001$). As shown in Appendix Table 2, 84% of our participants were currently employed in a work relationship.

Additionally, the relative majority (41%) of our sample owned a bachelor's degree (see Appendix Table 3). For the following statistical analysis, we employed IBM SPSS version 22 together with the PROCESS Macro version 3.3 by Andrew F. Hayes. The descriptive statistics summary can be found in Table 8.

Demographics	**Mean**	**StD**
Gender (Males) †	.54	.50
Age (in years)	37.68	12.44
Employed ††	.84	.37
Mediators and Controls	**Mean**	**StD**
Privacy Concerns	4.92	1.48
Familiarity of Product Class	3.91	1.31
Perceived Ease of Use	5.52	1.40
Perceived Usefulness	5.37	1.45
Personal Innovativeness	4.65	1.44
Dependent Variable	**Mean**	**StD**
eID Adoption	.72	0.45
Note: means and standard deviations; N = 161; † female = 0, male = 1; †† unemployed = 0, employed = 1		

Table 8. Descriptive statistics

5.5.2. Main effect analysis

To test H1 and H2, we conducted a three-stage hierarchical logistic regression on the dependent variable eID adoption (see Table 9). First, we examined the effect of our controls (Stage 1), whereupon we included our independent variables, namely default options and social proof (Stage 2). Finally, we added our mediator privacy concerns (Stage 3). Nagelkerke R2 and $\chi 2$-Statistics were computed to evaluate the models' significance for all three stages. None of the controls had a significant effect on eID adoption.

	Stage 1			Stage 2			Stage 3		
	Coeff	*SE*	*Exp(B)*	*Coeff*	*SE*	*Exp(B)*	*Coeff*	*SE*	*Exp(B)*
Intercept	-3.06	1.61	.05	-5.12**	1.87	.06	-1.86	2.26	.16
Manipulations									
Default Option †				1.32*	.53	3.76	2.11**	.65	8.21
Social Proof †				1.54**	.55	4.67	1.38*	.60	3.96
Mediator and Controls									
Privacy Concerns							-.85**	.26	.43
Age	-.03	.02	.97	-.03	.02	.97	-.03	.02	.98
Gender (male)	-.64	.48	.53	-.82	.53	.44	-.49	.56	.61
Education	-.16	.24	.86	-.14	.28	.87	-.14	.31	.87
Employed	-.14	.66	.87	.14	.28	.94	.39	.87	1.48
Familiarity of Product Class	-.40	.21	.67	-.37	.23	.69	-.45	.27	.64
Perceived Usefulness	.73**	.24	2.08	.59*	.25	1.82	1.05**	.34	2.85
Perceived Ease of Use	.39	.23	1.47	.39	.25	1.47	.07	.28	1.07
Personal Innovativeness	.48*	.19	1.62	.73**	.23	2.08	.72**	.25	2.05
Nagelkerke's R^2	.49			.58			.65		
-2 (Log-Likelihood)	124.06			108.78			94.18		
Omnibus-Tests	66.72***			81.99***			96.60***		

*Note: N = 160; * p < 0.05; ** p < 0.01; *** p < 0.001; SE= Standard Error; Coeff = Beta Coefficients; † absent=0, present=1*

Table 9. Direct Effect Analysis – Binary Logistic Regression on eID adoption

We found supporting evidence for H1 and H2 in the results of our logistical regression. The results show a significant positive effect of default options (b = 2.105; Wald statistic (1) = 10.498; $p < 0.01$) and social proof (b = 1.375; Wald statistic (1) = 5.284; $p < 0.05$) on eID adoption (see Table 9). Consistent with H1, the odds of adopting eID in the presence of a default option are 8.21 times the odds of eID adoption in absence of a default option. Furthermore, when social proof was present, participants were 3.96 times more likely to adopt eID than when social proof was absent. Moreover, we conducted one-way ANOVAs with planned contrast analyses to further examine the potentially synergetic effect of both nudges. As depicted in Figure 14, the results show that when eID is the default option, users were more likely to choose an eID compared to when no default was given (46% vs. 76%; $p < 0.01$). Further, when social

proof cues were present, users were more likely to choose an eID compared to when social proof cues were absent (46% vs. 74%; $p < 0.01$). However, the strongest effect on eID adoption could be found when a default option was combined with social proof cues (87%). Taken together, our results support our H1 and H2 hypotheses, verifying that both nudges distinctly and significantly increase eID adoption.

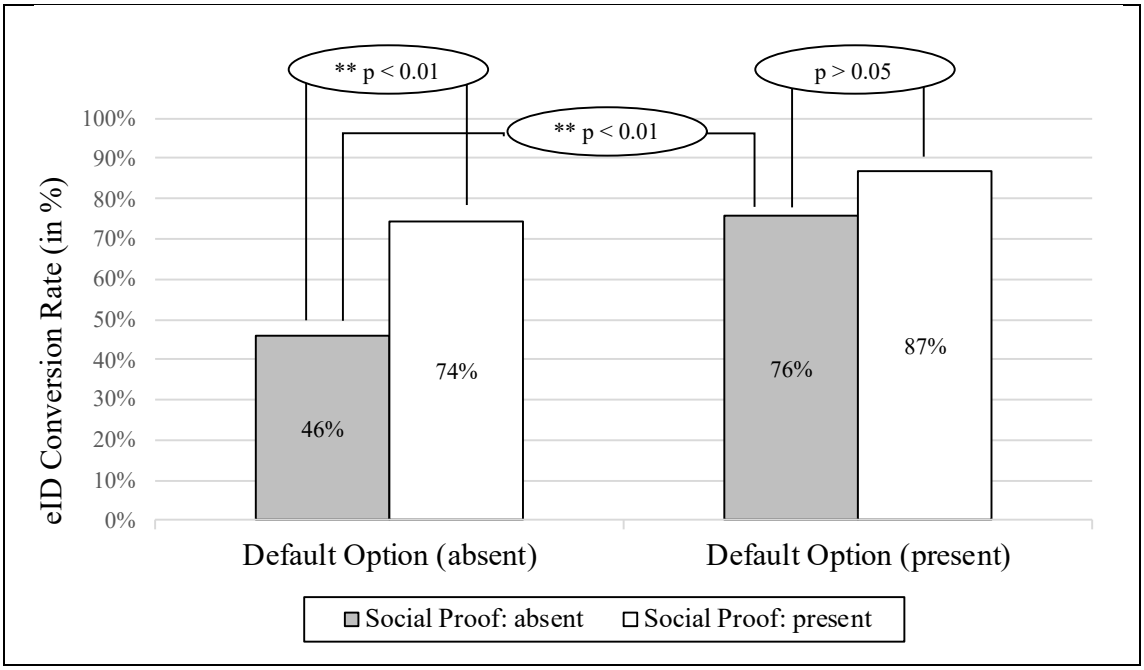


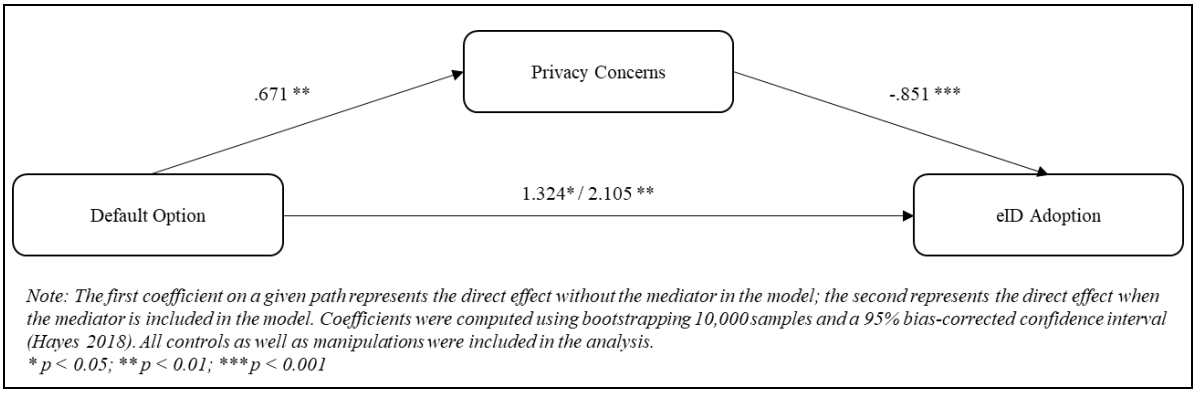
Figure 14. eID Adoption for Experimental Groups

5.5.3. Mediation analysis

We contended in H3 that privacy concerns will mediate the effect of default options on eID adoption. To investigate the mediation of privacy concerns between default option and eID adoption, we drew on a bootstrap mediation analysis with 10,000 samples and a 95% bias-corrected confidence interval as suggested by Hayes (2018, model 4).

For that, we entered privacy concerns as potential mediator between default options and eID adoption. Our analysis unveiled a statistically significant indirect effect of default options through privacy concerns on eID adoption (indirect effect = -.571; standard error = .324; 95% bias-corrected confidence interval (CI) = [-1.031, -.080]). Moreover, we found that the direct effect of default options on eID adoption remained significant after adding privacy concerns as mediator in our model, representing a partial mediation (Hayes 2018). Furthermore, default options significantly increased privacy concerns ($b = .671$; $p < 0.01$) while privacy concerns had a negative effect on eID adoption ($b = -.851$; $p < 0.001$). Hence, in support of H3 the

analysis confirmed that default options increase users' privacy concerns and therefore decrease eID adoption (see Figure 15).



Note: The first coefficient on a given path represents the direct effect without the mediator in the model; the second represents the direct effect when the mediator is included in the model. Coefficients were computed using bootstrapping 10,000 samples and a 95% bias-corrected confidence interval (Hayes 2018). All controls as well as manipulations were included in the analysis.
** p < 0.05; ** p < 0.01; *** p < 0.001*

Figure 15. eID Mediation Results

5.5.4. Moderation effect analysis

We proposed in H4 that the indirect effect of default options on eID adoption through privacy concerns is moderated by social proof. We drew on a moderated mediation analysis based on Hayes (2018) using bootstrapping with 10,000 samples and a 95% bias-corrected confidence interval to test the conditional indirect effect of default options on eID adoption through privacy concerns.

For our moderated mediation analysis, we conducted two separate multiple regression models. The first model included default options, social proof, and all controls as independent variables and privacy concerns as the dependent variable. The analysis confirmed a positive and statistically significant effect of default options on privacy concerns ($b = .662$; $p < 0.01$). Next, we included privacy concerns, social proof, the interaction term, all controls as independent variables as well as eID adoption as dependent variable consistent with Hayes (2018, model 14). The model revealed a positive significant interaction of social proof and privacy concerns ($b = .947$; $p < 0.05$) on eID adoption, demonstrating that social proof cues interact with privacy concerns such that individuals are opting for eID albeit their privacy concerns. In addition, and more important to our theorizing, Table 10 sheds further light on the indirect effect of default options on eID adoption via privacy concerns in the presence and absence of social proof cues. The results show that the indirect effect of default options on eID adoption via privacy concerns is significant only in the absence of social proof cues (indirect effect = -.913; CI = [-2.072, -.192]) but not in their presence (indirect effect = -.285; CI = [-1.005, .517]), in support of H4.

Social Proof	Coefficient for Indirect Effect	Boot SE	BootLLCI	BootULCI
Absent	-.913	.668	-2.072	-.192
Present	-.285	.369	-1. 005	. 517
Note: Coefficients were computed based on moderated mediation analysis incl. all controls and using bootstrapping with 10,000 samples and a 95% bias-corrected confidence interval (Hayes 2018)				

Table 10. Conditional Indirect Effect of Default Options on eID Adoption

Furthermore, to facilitate interpretation of the moderated relationship between privacy concerns and eID adoption in absence and presence of social proof, we conducted a simple slope analysis drawing on Hayes (2018, model 1) using bootstrapping with 10,000 samples and a 95% bias-corrected confidence interval (Figure 16). Overall and as shown in Figure 16, the interaction effect of social proof with privacy concerns on eID adoption is significant in the absence of social proof ($b = -.16$; $p < 0.001$) but becomes insignificant in the presence of social proof ($b = .00$; $p > 0.05$), demonstrating that social proof cues nullify the effect of privacy concerns on eID adoption.

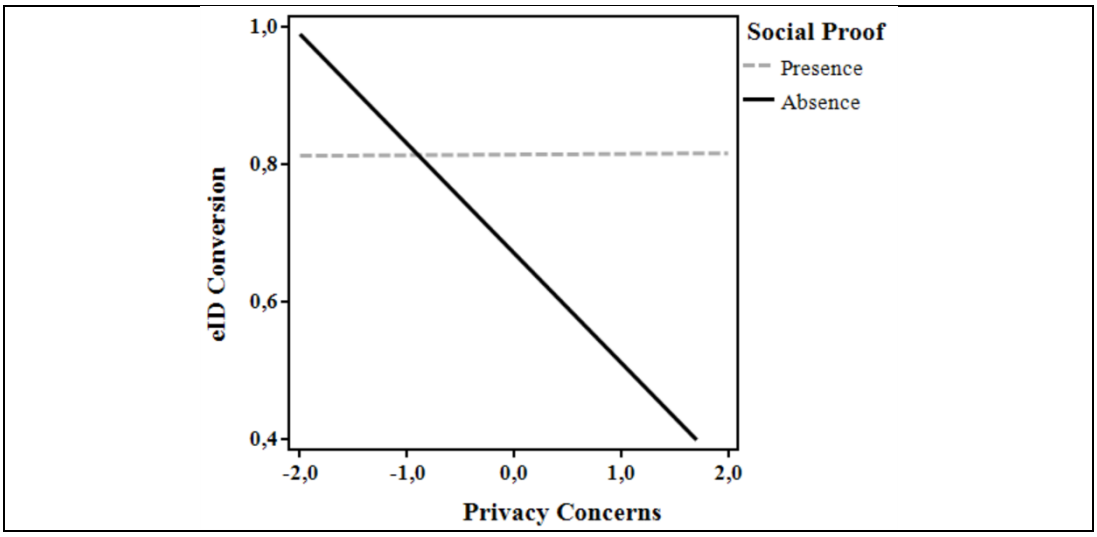


Figure 16. Moderation analysis for the interaction effect of social proof and privacy concerns on eID adoption

5.6. Discussion

With the rise of new online business models, the use of digital identity verification technologies such as eID has seen an increasing relevance over the past recent years. While the private sector has experienced broad adoption of such services in various applications (e.g., carsharing, banking), the public sector still remains largely underpenetrated with countries exhibiting great variety in adoption rates. However, eID represents a central pillar for the success of e-government initiatives, especially since eID requires cross-national acceptance to fully unfold its benefits. The purpose of this study is to provide a more solid foundation on how governments can increase eID adoption in the context of recent e-government initiatives, while limiting their potential effects on privacy concerns. To achieve this, we conducted a scenario-based experiment by applying two nudges, default options and social proof, in the context of renewing driver licenses via an e-government website. We shed light on the synergy between both nudges and how their joint effect attenuates and even cancels out the negative effect of privacy concerns on users' eID adoption to increase government digitalization. Our results show that both default option and social proof significantly increase eID adoption and that the effect is strongest when they are applied in combination. While the individual effects of both default option and social proof on eID adoption is similar, we find that default options are a double-edged sword as they simultaneously increase privacy concerns towards the government. However, the effect of default options on eID adoption via privacy concerns becomes insignificant once social proof is added as a moderator, thereby offsetting the negative effect of privacy concerns on eID.

5.6.1. Theoretical and Practical Contributions

Our study provides several contributions relevant to both academia and practitioners. From a research perspective, our study provides a fresh perspective on eID adoption in an e-government context and contributes to the scarce IS literature on digital nudging. While several studies have been conducted in the context of e-government, this study focuses on one particular element of e-government, namely eID, which represents a foundational technological enabler for e-government success. We found support that eID adoption can be directly increased by applying default options and social proof as nudges when users are asked to select eID vs. traditional ID on government websites. Previous nudging research in government contexts has focused on applying nudges in offline environments, such as painting jagged or sharp lines on roads to slow down driving speed or by employing opt-out defaults to increase pension plan and organ donation rates (Madrian and Shea 2001; Johnson and Goldstein 2004). With

transactions and thus decisions increasingly shifting online, the design of digital user interfaces is going to play an increasingly central role. This highlights the importance of transferring digital nudging elements into the realm of e-government, where citizens interact electronically with governments.

Second, we not only find support that nudging via default options and social proof is effective in e-government, but also that default options are a double-edged sword because they also increase privacy concerns. Default options have shown to directly affect users' perceived control over their personal data, resulting in greater user privacy concerns (e.g., Kim et al. 2008; Xu and Gupta 2009). This is particularly relevant since default options represent a frequently used nudge by governments. In this study, we identified and presented a complementary social nudge that mitigates those privacy concerns. More specifically, our results show that privacy concerns resulting from the use of default options may be attenuated if default options are accompanied by social proof.

Third, we provide a novel contribution to IS literature on digital nudging. Previous research on digital nudging in privacy-related choice environments has mainly focused on the isolated and separate effects of default options and social proof and has predominantly focused on social networks as research contexts (e.g., Center for Health and Safety Culture 2018; Koch and Benlian 2015; Choi et al. 2003). Our study represents the first attempt to theoretically integrate default options and social proof as nudges in an e-governmental context. We showed that the detrimental effects of one nudge can be cancelled out by applying a second one and that the total combined effect is greater than that of a single nudge. Furthermore, the use of social proof as a nudge may increase in relevance in the future, particularly due to the various use cases enabled in online environments where a large number of users can be reached more efficiently.

From a practitioner's perspective, this paper provides crucial insights for governments into leveraging digital nudges on e-government websites to increase eID adoption. Increasing eID adoption can help unlock economic value of 3-13 percent of GDP in developed and developing countries until 2030, and thus represents a vital building block of current and future e-government strategies (McKinsey 2019a). To achieve this, e-government should continue to leverage nudges when having citizens choose between traditional and online services. At the same time, we show how governments can reduce the negative effect on eID adoption through privacy concerns resulting from the use of default options by adding social proof cues. Privacy concerns represent a key obstacle in new technology adoption. Since governments may not always enjoy high trust levels by citizens, particularly with respect to recent data scandals, they could leverage signals, which are perceived to be more trustworthy by other citizens. Thus,

integrating social proof elements by showing what decision other citizens have made in addition to what the government recommends could alleviate potential privacy concerns. In this way, a pre-selection of the eID option is a viable strategy when designing new e-government choice environments. In the same way, targeting users with lower (dispositional) privacy concerns and mitigating privacy concerns of people with on average higher levels of privacy concerns seem to be adequate tactics to increase eID adoption rate. Our findings may also be applied in other contexts besides e-government such as e-banking or electronic postal services, where privacy concerns represent a barrier to technology adoption. More specifically, the use of default options and social proof might also be used in digital banking or digital postal services to drive its use and accelerate wider use of new technologies which are often faced with greater privacy concerns due to sharing of sensitive data.

5.6.2. Limitations and Directions for Future Research

Our study should be treated as an initial investigation into the realm of default options and social proof in eID adoption decisions and, thus, needs to be understood with respect to some noteworthy limitations. These limitations simultaneously represent opportunities for future research.

First, we conducted a scenario-based experiment with no real-world and consequential decisions to adopt eID in the e-government context. While the mock-up of the website was designed based on existing e-government websites and feedback from government officials and while participants were informed that the results of the study were used to refine real e-government websites, we acknowledge that a scenario-based, hypothetical setting might have limited the practicality and generalizability of our results. Nevertheless, we followed recommendations in the methodological literature that has shown that by improving the realism in the stimulus presentation, scenario-based experiments can be valid and effective methods in assessing individuals' perceptions of and reactions to specific information privacy- and security-related conditions (Aguinis and Bradley 2014).

Second, despite recent changes in the EU general data protection regulation (GDPR), we believe that our contribution nevertheless represents a valuable finding for research in e-government contexts. Since governments are no private organizations and already collect, process and store private data as well as frequently practice default options to nudge users in various decisions (e.g., organ donations), we do not believe legal requirements will impair the employment of such nudges if applied by governments. Furthermore, our scientific

contributions regarding the interplay of the effects of default options and social proof will still be valid in other e-government applications and geographic areas.

Third, our study focused on the short-term effects of default options and social proof in one-off decisions and used a specific scenario ("ID/driver's license renewal") on e-government websites. Future research may look at users' long-term behaviors and on how continuous exposure to default options and social proof shapes eID adoption in various e-government decision settings. In doing so, future studies may for example draw on randomized field experiments on real e-government platforms to investigate these effects longitudinally (Karahanna et al. 2018).

Fourth, while our study showed that social proof moderates the effect of privacy concerns resulting from default options on eID adoption, the results did not provide a specific explanation for that effect. Thus, future studies can look at potential mediating effects on the relationship between social proof and eID adoption. Moreover, our study included only one moderator, namely social proof. However, the effect of default options on eID could be moderated by other factors as well, such as through framing of arguments or statements (Toulmin 1958). Previous studies have shown that arguments should include both a claim and claim-supporting data to increase credibility of the claim. This could represent an interesting avenue for future research to increase the effectiveness of nudges and increase adoption or conversion rates (e.g., Schneider et al. 2017).

Finally, our study is based on a rather homogeneous group as all subjects have been recruited from the US via Amazon Mechanical Turk. To generalize our study results, it will be necessary to conduct studies in broader settings, such as on a multi-country level. For example, participants living in the US may be considered more open towards new technology. At the same time, surveys also show that trust in governments is at an all-time low in the US (Pew Research Center 2019). While low trust might be an indication for greater skepticism towards the government in the US in general (and thus higher overall privacy concerns), it should not have influenced our principal construct, given that we controlled for related factors either directly or through randomization.

While we believe that this study shows how governments can promote the success of e-government programs by increasing eID adoption through the use of digital nudges, the combination of digital nudges and eID in governmental contexts still represents a largely unchartered territory. We hope that our results provide impetus for further analysis of design components that may be leveraged in digital transactions between governments and citizens to further increase eID adoption.

5.7. Appendix

Construct	Items
Information Privacy Concerns ($\alpha = 0.84$)	• I am concerned about anonymous information (information collected automatically but cannot be used to identify me, such as my computer, network information, operating system, etc.) that is collected about me. • I am concerned about how my personally un-identifiable information (information that I have voluntarily given out but cannot be used to identify me, e.g., Zip Code, age-range, sex, etc.) will be used by the government • I am concerned about how my personally identifiable information (information that I have voluntarily given out AND can be used to identify me as an individual, e.g., name, shipping address, credit card or bank account information, social security number, etc.) will be used by the government
Familiarity of Product Class ($\alpha = 0.78$)	• Rate your previous knowledge of driving licenses, compared to the rest of the U.S. population • Rate your usage experience of driving licenses, compared to the rest of the U.S. population • Rate your previous knowledge of eID, compared to the rest of the U.S. population • Rate your usage experience of eID, compared to the rest of the U.S. population
Perceived Usefulness ($\alpha = 0.94$)	• Using eID increases productivity • Using eID enhances my effectiveness with government related services • Using eID makes it easier to do my job with government related services
Personal Innovativeness ($\alpha = 0.82$)	• If I heard about a new information technology, I would look for ways to experiment with it. • Among my peers, I am usually the first to try out new information technologies. • In general, I am hesitant to try out new information technologies. • I like to experiment with new information technologies.
Perceived Ease of Use	• I find eID easy to use
Note: Items were measured using a 7-point Likert scale ranging from strongly disagree (1) to strongly agree (7).	

Table 1. Measurement Items

	Occupation	N	
1	Unemployed	12	7.5%
2	Student	7	4.4%
3	Scholar	2	1.3%
4	Apprenticeship	1	.7%
5	Training	4	2.5%
6	Self-Employed	27	16.9%
7	Employed	107	66.9%

Table 2. Frequency Distribution of Occupation Scale

	Education	N	
1	Some school, no degree	2	1.3%
2	High school graduate	11	6.9%
3	Some college, no degree	49	30.6%
4	Bachelor's degree	65	40.6%
5	Master's degree	24	15.0%
6	Professional degree	2	1.3%
7	Doctorate degree	2	1.3%

Table 3. Frequency Distribution of Education Scale

Study	Context	Digital Nudge	Dependent Variable	Study type
Kroll, T., & Stieglitz, S., 2019	Online Social Networks	Framing Nudges	Self-Disclosure	Survey with 381 cross-cultural participants
Dogruel, L., 2017	Cross cultural media policies	-	Nudge effectivenes and intrusivenes	Survey with 51 German and US participants
Cao, Z., Hui, K.-L., & Xu, H., 2018	Online Social Networks	Nudging vs. Quota	Information Disclosure	Stylized model study
Cavusoglu, H., Phan, T. Q., Cavusoglu, H., & Airoldi, E. M., 2016	Online Social Networks	Control Nudges	Information Disclosure	Observational study with 13,145 cross-cultural active users
Wang, C., Zhang, X., & Hann, I.-H., 2018	Online Social Networks	Social Influence Nudges	Product Ratings	Observational study with 8 million registered users
Looney, C. A., & Hardin, A. M., 2009	Financial Portfolio Management	Default Option Nudges	Portfolio Risk	Online laboratory experiment with 159 participants
Adjerid, I., Acquisti, A., & Loewenstein, G., 2018	Digital services	Framing Nudges	Information Disclosure	Four laboratory experiments with 105, 204, 189, 300 participants

Table 4. Systematic Literature Overview of Digital Nudging in Privacy Contexts

6. Thesis Conclusion and Contributions

Technological advancements, particularly the rise of new digital solutions, have changed entire industries' business dynamics (Bharadwaj et al. 2013) and how businesses and governments interact with their citizens (Benlian et al. 2020; West 2004). As transactions between organizations and consumers are increasingly shifted online, the decision environments change, requiring organizations to adapt to ensure that the value created is also captured (i.e., converted). The use of visual user interface elements to influence consumer behavior in digital choice environments, so-called digital nudges, demonstrates that decision processes can be influenced to increase conversion rates. This thesis is motivated by the need to understand better how to leverage digital nudges to increase conversion outcomes in profit-oriented and non-profit oriented business models. To achieve this, three studies were conducted employing a set of digital nudges leveraging two bias categories, namely perception bias and stability bias. The studies were conducted in both profit-oriented and non-profit oriented environments. The main findings are discussed and summarized in sections 6.1 and 6.2., along with their main theoretical and practical contributions.

6.1. Theoretical Contributions

This thesis contributes to a better understanding of how digital nudges can be employed to increase user conversion in profit and non-profit oriented organizations. As the studies were conducted in two separate environments, each organizational type's main contributions will are discussed separately. The first and third study has contributed to a better understanding of how digital nudges may enhance user conversion in non-profit oriented organizations by leveraging the emotional bias and status quo bias to increase conversion. The emotional bias is applied in the context of a non-commercial online sharing platform, while the effect of the status quo bias is examined in the e-government context. The second study investigates the impact of framing and loss aversion bias to increase the conversion rate on a profit-oriented online carsharing platform. We find that all biases increase the probability of user transaction likelihood.

The first study contributes to the scarce Information Systems (IS) literature on non-commercial online sharing platforms by introducing prosocial behavior or prosociality as a central design feature on websites to increase transaction likelihood. We show that prosocial behavior qualifies as behavioral trait influencing user behavior in the IS space by appealing to the emotional feeling of reciprocity. The study uses donations as a proxy for prosocial behavior following a successful transaction. By making donations part of the transaction, previous

research was confirmed. Concretely, we show that altruistic motives such as benevolence might impact users' likelihood of engaging with each other. Second, the results extend current literature on trust-enhancing features in peer-to-peer marketplaces (e.g., Benlian and Hess 2011). Typically, digital transactions are characterized by a certain degree of asymmetric information. Thus, enhancing reputational mechanisms to strengthen trust among the transacting parties is critical. While existent literature has primarily focused on more traditional trust-enhancing features such as peer reviews, the study contributes to additional features that might be leveraged to increase trust among parties by nudging prosociality.

The third study complements the first study by investigating the effect of default options and popularity signals on users' eID adoption behavior in the non-profit oriented e-government context. Both digital nudges have significantly increased eID adoption or the conversion rate to opt for eID vs. traditional ID. While default options have been widely used in both online and offline contexts, the study suggests that default options should be used cautiously. While users might be nudged into opting for a preselected option, privacy concerns are fueled simultaneously. The negative effect on privacy concerns also translates into a lower overall impact of the default option on the conversion rate. However, these concerns can be mitigated by adding social proof cues to the default option. Previous nudging research in the government space has focused mainly on applying nudges in offline environments and a strong focus on defaults. This study extends the application of nudges in the digital context and sheds some light on its interplay with social proof, a digital nudge that has not been assessed in the government context so far. Thus, this study represents the first attempt to theoretically integrate default options and social proof as nudges in non-profit oriented digital business models.

The second study is conducted in the profit-oriented context, namely a fictional online carsharing platform, and shows how to nudge users into verifying their ID online instead of traditional offline verification by leveraging Regulatory Focus Theory to develop two oppositely framed communication arguments. We find that both outcome-oriented and prevention-focused framed claims significantly increase the online verification conversion rate if supported by data. However, the effect of the promotion-oriented claim is more substantial in combination with supporting data. If data does not support the claim framed towards preventing risks, it actually decreases online ID verification rate in comparison to a scenario where no claim is shown.

This study contributes to existing research in several ways. The majority of previous research in the field of assurance mechanisms focused on the separate effect of framed communication arguments (e.g., Pavlou and Gefen 2004; Pennington et al. 2003; Suh and Han 2003; Malhotra

et al. 2004) and third-party seals (e.g., Lansing et al. 2019; Lansing et al. 2018; Hu et al. 2010; Kim 2008). The holistic perspective of this study reveals novel interaction effects overlooked in previous research. Additionally, the framing of both prevention- and outcome-oriented arguments shows that when potential losses such as loss of private data or the avoidance of such a loss (prevention-focus claim) resulting from a particular transaction are emphasized, users are more likely to opt for the other alternative presented if data does not support the claim. Thus, the loss aversion bias might only be triggered if users feel they cannot trust a particular claim.

6.2. Practical Contributions

This thesis also provides valuable insights for private and public non-profit oriented organizations aiming to increase user conversion in digital environments.

From an organizational perspective, platform operators should consider introducing a scheme that incentivizes transactions by adding digital nudges triggering emotional feelings upon a successful transaction on the platform. By leveraging perception biases, organizations might include prosocial cues on their websites to indicate supportive behavior (e.g., through donations). While these nudges may not only contribute to greater transaction likelihood, organizations could also benefit from positive spillover effects resulting from their involvement in charity work. This might prove particularly useful in non-profit oriented organizations where other factors than pure rationalism might be the driver to engage in a particular transaction.

Additionally, the study offers insights into how assurance claims on websites should be framed to increase user conversion. More specifically, we find that if user privacy concerns might be present, organizations should either explain how they are mitigated and support the claim by data. If data cannot support the organizations' claim, organizations might be better off not mentioning a mitigation claim at all. Frequently used data elements, among other things, include third-party assurance seals.

Moreover, the findings indicate that several character traits are likely to influence users' decision to opt for online versus offline ID verification. For example, users with high privacy concerns are only half as likely to verify online than users with low privacy concerns. Hence, in countries with rather high Internet privacy concerns, digital platforms requiring ID verification should carefully design privacy-conveying claims and support them with third-party assurance seals to increase the proportion of users who verify online. Similarly, digital platforms should reduce privacy concerns early on in registration processes and display them only when the ID verification decision is made.

Furthermore, governments should continue leveraging nudges when having citizens choose between traditional and online services. While default options have proven to help achieve particular governmental objectives, they also carry a certain risk due to increased privacy concerns. Privacy concerns have shown to be a significant obstacle to e-government adoption. Thus, the use of default options should be carefully balanced with its impact on privacy concerns. In case the effect of default options is "too good to be neglected", governments could leverage other signals that other citizens perceive as trustworthy. For example, by showing citizens which decision other citizens have made in addition to what the government has recommended could reduce the negative effect of default options on potential privacy concerns. These findings may also be applied in other contexts besides e-government, such as e-banking or electronic postal services, where privacy concerns represent a barrier to technology adoption. From a user perspective, adding prosociality nudges on personal profiles in the online world may increase interaction likelihood with other users. Thus, digitally nudging positive behavior to trigger emotional feelings might actually be helpful to fulfill personal objectives such as trading goods online. However, users should carefully consider the potential downsides of self-promoting themselves as particularly prosocial. While prosocial behavior is rewarded to a particular extent, excessive prosociality might be penalized as users might perceive excessive prosocial behavior as "too good to be true". Thus, while adding cues of donation behavior to user profiles may increase the likelihood of being selected as transaction partner, the effect will not proportionally increase with additional signs of prosociality.

6.3. Limitations and Future Research

This study should be interpreted in light of some noteworthy limitations, which simultaneously might represent future research avenues. There are some general limitations to using nudges to achieve a particular outcome, which is described first. In the next step, the limitations of the findings resulting from the three studies are described.

The first general limitation of the use of nudges relates to their actual intention. Research on nudges offers a selective toolkit on creating interventions to promote a specific behavior (Thaler and Sunstein 2008). Thus, while nudging might promote certain outcomes, other solutions might lead to the same result even more effectively. As a result, one should carefully question the need and objective of the nudge and critically assess other options, such as offering users additional objective criteria to make a decision rather than subtly influencing them based on

their subjectivity. For example, while it may seem obvious that increasing premiums for non-healthy behavior (e.g., smoking or drinking) would lead to people adapting their habits to lower premiums, empirical evidence remains scant.

The second general limitation relates to the potential conflict of interest arising from the nudge setter and the person being nudged. The concept of libertarian paternalism advocates changes in the decision environment by framing options to steer people in a certain direction, ideally into making better choices. However, the complexity arises around the definition of "better choice" as this depends on each party's interest. While having citizens opt-out of organ donation schemes might illustrate an important societal contribution to save others' lives, these schemes compete with people's individual ethical considerations with regards to organ donation.

The third general limitation refers to the ubiquity of information resulting from the use of digital technologies and their impact on people's wellbeing. Ayyagari et al. (2011) demonstrated that usability and intrusiveness are related to stressors, including work overload and privacy invasion. As several business models are geared towards creating continuous user engagement, nudges might be exploited to drive users into spending even more time online, contributing to growing stress levels (Benlian 2020).

Regarding the limitations of the findings resulting from the three studies, the first limitation relates to how the studies were conducted. All three studies were performed in an experimental setting by leveraging click workers and do not represent actual transaction behavior. Thus, even though participants rated the experimental setting as realistic, it is recommended to repeat the experiment in the field with real users to validate the theoretical findings. Furthermore, this study compares the use of different digital nudges in two different contexts, namely in profit-oriented and non-profit oriented business models. Even though the digital nudges are part of two major behavioral bias categories, the digital nudges themselves are not comparable. Thus, to increase the validity of the findings, it is recommended to apply the same digital nudge in both a non-profit and profit-oriented business model context. Ideally, this leads to greater comparability of results.

Finally, while the results of the three studies have all shown how to increase conversion rate by leveraging digital nudges, only one study assessed the impact of multiple digital nudges working together and their impact on additional decision criteria such as privacy concerns. As a result, it is recommended not only to assess the effect of digital nudges on single outcomes such as conversion rates but also to embrace a broader picture to identify potential adverse spillover effects and how these may be mitigated – potentially through the use of additional nudges.

In conclusion, this thesis contributes to a greater understanding of how profit-oriented and non-profit oriented organizations can leverage digital nudges to increase conversion rate. While several factors such as the perceived value of goods or services and price are part of the decision-making process when transacting online, understanding the effect of psychological elements or biases is equally critical. By specifically triggering these biases, organizations may influence user behavior in digital environments towards a direction, which the user otherwise might not choose. Thus, to successfully interact online, organizations should combine the actual benefits of their products or services offered with digital user-interface design elements, so-called digital nudges, to increase transaction likelihood. Nevertheless, I encourage responsible use of digital nudges given the potential lack of interest between the nudge setter and the person being nudged and the impact on technostress levels. I hope this research provides an impetus for further analyses on the subject.

Declaration of Authorship

I hereby declare that the submitted thesis is my own work. All quotes, whether word by word or in my own words, have been marked as such.

The thesis has not been published anywhere else nor presented to any other examination board.

Ich erkläre hiermit ehrenwörtlich, dass ich die vorliegende Arbeit selbstständig angefertigt habe. Sämtliche aus fremden Quellen direkt und indirekt übernommenen Gedanken sind als solche kenntlich gemacht.

Die Arbeit wurde bisher weder einer anderen Prüfungsbehörde vorgelegt noch veröffentlicht.

David Schneider

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David Schneider

3rd May 2021

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1_2andsortC=ASC_-1_FIRSTandrStp=andcStp=andrDCh=andcDCh=andrDM=trueandcDM=trueandfootnes=falseandempty=falseandwai=falseandtime_mode=NONEandtime_most_recent=falseandlang=ENandcfo=%23%23%23%2C%23%23%23.%23%23%23.

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